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THE PLANT DISEASE REPORTER

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THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
AGRICULTURAL RESEARCH ADMINISTRATION
UNITED STATES DEPARTMENT OF AGRICULTURE

SUPPLEMENT 167

AN EVALUATION OF CERTAIN PHASES OF THE EMERGENCY PLANT DISEASE PREVENTION PROJECT

Supplement 167 May 1, 1947

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

PLANT DISEASE REPORTER SUPPLEMENT

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THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station Beltsville, Maryland

AN EVALUATION OF CERTAIN PHASES OF THE EMERGENCY PLANT DISEASE PREVENTION PROJECT[1]

Paul R. Miller and Jessie I. Wood

Plant Disease Reporter
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INTRODUCTION

Agriculture's World War II slogan, "Food will win the war and write the peace", emphasizes the vital necessity of maintaining food production during time of war. Food crops are subject to attack by many enemies even in ordinary times, and an epiphytotic in a mainstay crop during time of war could have serious or even disastrous results, as instanced by the devastating outbreak of late blight in the German potato crop in 1917 that is believed to have been an important factor in Germany's economic breakdown leading to the end of World War I.

These considerations, and the fact that food crop production would be especially vulnerable to deliberate sabotage if not protected against it, led to the initiation of the Emergency Plant Disease Prevention Project by the Plant Disease Survey, July 1, 1943. The project was approved by the Secretary of War and supported from emergency funds made available by the President. Broadly stated, the purpose of this project was to help protect the country's food, feed, fiber, and oil supplies by insuring immediate detection of enemy attempts at crop destruction through the use of plant diseases, and by providing production specialists and extension workers with prompt and accurate information regarding outbreaks of plant diseases, whether introduced inadvertently or by design while still in incipient stages.

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[1] Although the Project was officially terminated June 30, 1945, this report has been delayed, chiefly for two reasons: (1) Previous commitments for some of this subject matter to be incorporated in an article for the current United States Department of Agriculture Yearbook. (2) It was anticipated that the War Department would lift restrictions relating to Biological warfare and thus make available to the public an interesting and perhaps important phase of the work.

Virulent strains of pathogenic organisms, if distributed in regions of high concentrations of food crops at a time of prevailing favorable weather, could within a short period of time accomplish the destruction of much of the yield. The freedom of movement in this country, the possibility of introduction and distribution of disease inoculum by aircraft or by torpedoed cargoes, transportation difficulties resulting from war activities, and the great increase in quarantine problems resulting from the many new ports, all offered enhanced opportunity for either or both introduction and spread, deliberate or accidental, of new or established pathogens.

National security restrictions prohibited discussion of malicious activity during the war, and even now consistency with wartime policies prevents the telling of certain phases of this work. However, while the specific purpose of the Project was not made public, it quickly became known in professional circles and among agricultural staff members in general that an alert, competent corps of pathologists was maintaining a vigilant watch on plant disease developments throughout the country. This fact, in itself, must have constituted substantial protection against would-be "inside job" saboteurs[2], since, unquestionably, malicious persons with sufficient technical knowledge of plant diseases to do damage early became aware of the protective measures being taken and the attendant personal danger of detection, as well as the likelihood that attempts at destructive use of plant diseases would be observed and brought under control.

Additional assurance against introduction of diseases with imported plant products was afforded by the parallel surveys conducted in the vicinity of ports of entry by inspectors of the Bureau of Entomology and Plant Quarantine.

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[2] Of course this type of defensive activity could be only partially effective in recognizing and preventing destruction resulting from devices operating from a foreign base. In this connection, perhaps some readers will be interested in a book published in 1944 by the Current Publishing Company, entitled "Japan's Secret Weapon", by Barclay Newman.

METHODS

The actual field work was conducted, on the average for the two years, by 24 pathologists who were each so assigned to specific territories as to cover the entire continental United States (see Table 1). Special emphasis was placed in strategic locations, for example the West Coast and other areas of highly concentrated food production. Fortunately, it was possible in nearly every area to assign a person already familiar with the geography and cropping practice of the region in which he was to work. The coverage of important winter truck crop areas in Florida, Texas, and California was increased during the winter months by transfer of personnel from less active regions.

In all cases, the cooperating experiment station officials participated in planning itineraries and in obtaining assistance of county agents and of State workers in general, so that the production areas of the entire country were placed under observation.

In addition, two field laboratories, one at Beltsville, Maryland, the other at Stillwater, Oklahoma, were established, with competent consulting diagnosticians in charge, where baffling cases of plant diseases could be sent for identification and verification of the causal agents.

Attention was focused primarily upon important food crops, although an effort was made not to overlook disease developments upon other plants. The "G-men" of plant diseases, who were well versed in field diagnosis, were each furnished a car and spent most of their time in the field gathering and recording information as complete as possible regarding the plant disease situation within their respective territories. Weekly reports were prepared in duplicate. One copy went to the officials of the State where the observations were made, the other was sent to the Beltsville Station for suitable action.

Table 1. Field and laboratory technical staff of the Emergency Plant Disease Prevention Project, July 1, 1943, to June 30, 1945. (1) = first assignment. (2) = second assignment. (W) = winter assignment. * = duration of assignment less than three months. Regular assignments in capital letters; temporary assignments in lower case.

ALTSTATT, G. E.	TEXAS
ATKINSON, R. E.	NORTH and SOUTH CAROLINA (1); VIRGINIA and WEST VIRGINIA (2)
BAIN, DOUGLAS C.	LOUISIANA and MISSISSIPPI
BAINES, R. C.	ILLINOIS and INDIANA

BARNETT, H. L. : CALIFORNIA
BLODGETT, E. C. : IDAHO and eastern tier of counties in
: OREGON and WASHINGTON
BODINE, E. W. : COLORADO and WYOMING; California (W)
BOYLE, L. W. : WASHINGTON and OREGON
BRAUN, ALVIN J. : OHIO and MICHIGAN
BRETZ, T. W. : IOWA and MISSOURI (1); MISSOURI (2)
CASSELL, R. C. : NEW ENGLAND STATES (1); NEW YORK and
: PENNSYLVANIA (2)
HARRIS, HUBERT A. : MONTANA
HARRIS, M. R. : OHIO and MICHIGAN
HARVEY, JAMES V. : CALIFORNIA
HONEY, E. E. : WISCONSIN
HOYMAN, WM. G. : ARIZONA and NEW MEXICO
HYRE, RUSSELL A. : KENTUCKY and TENNESSEE; Florida (W)
JACKSON, JOHN R. : ALABAMA and GEORGIA*
LARSH, HOWARD W. : ARKANSAS and OKLAHOMA; TEXAS (W)
LOCKE, S. B. : NEVADA and UTAH; California (W)
MIX, A. J. : DELAWARE, MARYLAND, NEW JERSEY
NAGEL, CLATUS M. : IOWA*
NIEDERHAUSER, JOHN S. : NEW YORK and PENNSYLVANIA*
OLIVE, LINDSAY S. : BELTSVILLE, MD., IDENTIFICATION LABORATORY
PADY, S. M. : KANSAS and NEBRASKA; Texas (W)
PERSON, L. H. : LOUISIANA and MISSISSIPPI
PRESTON, D. A. : STILLWATER, OKLA., IDENTIFICATION LABORATORY
PRINCE, A. E. : NORTH and SOUTH CAROLINA
RAY, W. W. : STILLWATER, OKLA., IDENTIFICATION LABORATORY
RHOADS, A. S. : FLORIDA (1); NEVADA and UTAH (2)
SCHLATTER, F. P. : FLORIDA*
SCHNEIDER, HENRY : CALIFORNIA
SHANOR, LELAND : BELTSVILLE, MD., IDENTIFICATION LABORATORY
SLAGG, C. M. : Florida (W); MONTANA (1); KANSAS and NEBRASKA
: (2)
STONE, G. M. : ALABAMA and GEORGIA
TAYLOR, ALBERT L. : Nematode Survey in SOUTHERN STATES
TAYLOR, C. F. : VIRGINIA and WEST VIRGINIA
TERVET, IAN W. : MINNESOTA and NORTH and SOUTH DAKOTA
TIDD, J. S. : CALIFORNIA (1); INDIANA and ILLINOIS (2)
TYLER, L. J. : NEW YORK and PENNSYLVANIA
VESTAL, EDGAR F. : IOWA
WALKER, E. A. : DELAWARE, MARYLAND, NEW JERSEY
WATKINS, G. M. : TEXAS
WATSON, R. D. : TEXAS*

RESULTS

A just evaluation of the contribution made by the Emergency Survey must take into account the real reason for its establishment with the attendant moral and financial obligation to adhere strictly to the primary aim, the absolute impossibility at any time to determine the Project's duration, the fact that the observations reported here were obtained incidentally to the main purpose of the Survey, the varying problems of different regions, and the still active effect of some of the findings. Considering all the factors affecting its operation, and all the use made of its results, we believe the Survey has presented concrete favorable evidence of the fundamental importance of this type of field investigation, whether during time of war or peace.

An indispensable prerequisite to the functioning of the Project, gratefully acknowledged and continually stressed by the field men in their reports, was the generous aid given by State personnel. State research, extension, and control programs benefited materially from the acquisition of data on which to base new investigation or to verify or change emphasis of established programs, but the benefit was mutual since the foundation of local knowledge necessary for effective reconnaisance was furnished by the State workers, who also took part in many of the surveys and helped to make reports more comprehensive by supplying missing data from their own observations.

The diversity in scope and content of the State surveys necessitated by fundamental differences in individual problems resulted in correspondingly varied products that do not fit very smoothly into a systematic presentation for the country as a whole. For this reason, mainly, a truer idea of the real value of the Survey can be gained from consideration of significant accomplishments of various types than from a general summary that would surely be inadequate.

The most obvious contribution was the specific information obtained on the presence and distribution of diseases, nationally and locally. Authenticity of the reports of new or unusual distribution was assured by the accurate determination of the organisms involved by the personnel of the two identification laboratories. Approximately 2500 plant disease specimens were submitted by the staff to the two field laboratories for diagnosis or verification. Those of sufficient interest and permanent value have been placed in the Mycological Collections of the Bureau of Plant Industry, Soils, and Agricultural Engineering.

Diseases that so far as could be determined were "new", i.e., not reported at all prior to this Survey, discovered in this country for the first time, or found on a new host, are listed in Table 2. As might be expected, the individual diseases differ greatly in importance. The discovery of the potato rot nematode in Idaho before it was too late to prevent unsuspected spread to other potato-growing areas is a major contribution to the welfare of the crop (see Blodgett's report in Appendix below). Other discoveries involved less menacing potentialities but were significant in various ways. Some probably represented sporadic occurrences dependent on exceptional local conditions.

Table 2. New diseases found during the Emergency Plant Disease Prevention Project surveys (previously undescribed diseases = *; diseases found in this country for the first time = **; diseases found on new hosts = ***)

Host Disease (Cause)	Where found	Remarks
Artichoke Dwarfing and mottling (? Virus)*	Calif.	
Asparagus Charcoal rot (*Macrophomina phaseoli*)***	Texas	
Bean and lima bean Witches'-broom (Undet., ? virus)*	Ariz.	Possibly caused by some already described virus
Bean, lima Leaf spot (*Ascochyta boltshauseri*)***	N. Car.	
Bean, mung Yeast spot of seed (*Nematospora coryli*)***	Okla.	
Broccoli White leaf spot (*Cercosporella albo-maculans*)***	Pa., and in market, origin unknown, Ind.	
Lettuce, eggplant, pepper Root rot (*Aphanomyces* sp.)*	N. J.	Found on lettuce seedlings in coldframes on one farm where it caused some loss; same fungus later found on eggplant and pepper seedlings in greenhouse on another farm; loss of pepper plants was heavy
Potato Potato rot nematode (*Ditylenchus destructor*)**	Idaho	On a few farms in one potato section

Host Disease (Cause)	Where found	Remarks
Potato		
Ring spot (Tomato ring spot virus)***	Col., Wyo.	
Spinach		
Root rot (*Phytophthora megasperma*)***	Calif., N. Car.	In California the fungus causes root rot on various other hosts but had not been found on spinach previously. The fungus had not been known to occur in North Carolina before.
Cowpea		
Stem blight (*Diaporthe sojae*)***	Va.	Fungus common as cause of stem and pod blight of soybean; not reported on cowpea before.
Target spot (*Helminthosporium vignae*)*	La., N. Car., S. Car.	Causes severe spotting of leaves; also on stems
Leaf spot (*Myrothecium roridum*)***	La.	One location. Fungus consistently isolated from a particular type of leaf spotting
Peanut		
Anthracnose (*Colletotrichum* sp.)*	Okla.	Isolated from stem lesions
Stem blight (*Diaporthe sojae*)***	Va.	
Soybean		
Target spot (*Helminthosporium vignae*)*		Causes light spotting on soybean leaves. See cowpea
Powdery mildew (*Microsphaera* sp.)**	N. Car.	
Leaf spot (*Myrothecium roridum*)***	La.	One location. See cowpea

Host Disease (Cause)	Where found	Remarks
Soybean		
Yeast spot of seed (Nematospora coryli)***	Okla., N. Car., S. Car., Va.	Cultures of seed from various sources indicate disease widespread. Causes discoloration of seeds; in severe cases seeds do not mature and are badly shrivelled.
Seedling blight (Penicillium sp.)*	Ohio	Found on soybeans being tested for germination; strongly pathogenic in infection experiments.
Leaf spot (Phyllosticta sojaecola)**	Md., N.J.	Severe in many instances
Bacterial wildfire or halo blight (Pseudomonas tabaci)***	Found to be widespread in soybean areas	
Corn		
Bacterial leaf spot and top rot (undetermined bacterium)*	Kans., Nebr.	Potentially important under favorable conditions
Leaf striping (undetermined, ? virus)*[a]	Texas	Widely scattered in Lower Rio Grande Valley; more common on sweet and popcorn than field corn. Stunted bushy plants; green and white striped leaves with broad red or bronze longitudinal bands; production of ear shoots from lower nodes

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[a] Kunkel (Proc. Nat. Acad. Sci. Wash. 32: 246-247. 1946) has designated this disease as "stunt" and demonstrated its transmission by the leafhopper Baldulus maidis. The disease reported from Calif. by Frazier (PDR 29: 212-213. Mar. 7, 1945) slightly earlier than Altstatt's report from Texas (PDR 29: 533-534. June 15, 1945) is the same disease according to Kunkel.

Host Disease (Cause)	Where found	Remarks
Oats "Mosaic-chlorosis" (virus)*	N. Car., S. Car.	Rather generally distributed in both States
Sorghum Leaf spot (*Microdiplodia* sp.)*	La.	In one experimental planting.
Apple and pear Leaf and fruit spot (*Elsinoë piri*)	Wash., Oreg.	First found in Washington on apple by Bureau of Entomology and Plant Quarantine inspectors. Distribution determined, as well as occurrence on pear, by Emergency Survey

Field men encountered more than 150 diseases affecting some 60 crops in States where they had not previously been known to occur. Many of these records amounted to a mere verification of expected occurrence. Most, however, made a definite addition to knowledge of geographical distribution of disease, either by filling in gaps in the known disease situation on certain crops, notably soybean; or by determining previously overlooked components in diseases of varied or complex origin, e. g., *Cercospora zeae-maydis* as a predominant cause of corn leaf spot in eastern Kentucky and Tennessee; or by recording a significant extension of range, striking examples in this category being the discovery of *Macrophomina phaseoli* in Oregon and of elm phloem necrosis in Kansas, Arkansas, and Oklahoma. Table 3 lists a representative selection. Most of the original records were reported currently in the PLANT DISEASE REPORTER.

Table 3. Some diseases found during the Emergency Plant Disease Prevention Project surveys in States where they had not previously been known to occur.

Host Disease (Cause)	State	Remarks
Cantaloup, pumpkin, squash Charcoal root rot (*Macrophomina phaseoli*)	Oreg.	First report of the fungus in this State or so far north

Host Disease (Cause)	State	Remarks
Carrot		
Bacterial blight (*Xanthomonas carotae*)	Idaho	First reported in 1943 although evidently present earlier
Lettuce		
"Brown blight" (virus)	Ind.	Had recently been described from Ill. Occurs in greenhouse
Onion		
Smut (*Urocystis cepulae*)	Colo.	
Pepper		
Phytophthora blight (*P. capsici*)	Mo., La.	
Potato		
Psyllid yellows (tomato psyllid)	S. Dak.	
Spinach		
White blister (white rust) (*Albugo occidentalis*)	Okla.	Known only in Texas before
Leaf spot (*Heterosporium variabile*)	Fla., Okla.	
Curly top ? (virus)	Okla.	Characteristic symptoms
Summer squash		
Phytophthora capsici	Mo.	
Sweetpotato		
Mottle necrosis (*Pythium*)	Calif.	
Tomato		
Spotted wilt (virus)	Ariz.	
Corn		
Leaf spot (*Cercospora zeae-maydis*)	Ky., Tenn.	Known only in Ill. before

Host Disease (Cause)	State	Remarks
Corn		
Zonate spot (*Gloeocercospora zeae-maydis*)	Miss.	
Leaf and stalk rot (*Physalospora zeae*)	Ind.	
Bacterial stalk rot (*Phytomonas dissolvens*)	Mo.	
Flax		
Root rot (*Pythium aphanidermatum*)	Ariz.	
Wilt (*Sclerotinia sclerotiorum*)	Tex., Calif.	
Sorghum		
Leaf spot (*Ascochyta sorghina*)	Okla.	
Sorghum and broom corn		
Leaf spot (*Ramulispora sorghi*) (*Titaeospora andropogonis*)	Okla., Ark.	
Wheat		
Leaf spot (yellow spot) (*Helminthosporium tritici-vulgaris*)	Kans., Nebr., Va., W.Va., N.&S.Car.	Had recently been found in this country, in N.Y. and Md.
Soybean		
Bud blight or top necrosis (virus resembling tobacco ring spot virus)	Ark., Mo., Kans., Nebr., Ill., Wis., Minn., S. Dak.	Previously observed in Ohio, Ind., Iowa
Cotton		
Ascochyta blight (*A. gossypii*)	La.	

Host Disease (Cause)	State	Remarks
Tobacco Anthracnose (*Colletotrichum* sp.)	Va.	Previously known in Md.
Ring spot (virus)	Mass.	
Peach and chokecherry X-disease (virus)	Ohio	
Strawberry Red stele (*Phytophthora fragariae*)	Me.	
Elm Phloem necrosis (Virus)	Kans., Ark., Okla.	Previously destructive in Ohio River Valley but west of Miss. River known only in southeastern Mo. Besides new States, disease was found in additional widely scattered locations in Mo.
Oak Wilt (*Chalara quercina*)	Mo.	

Some diseases were observed to be more widely distributed than previously realized in States where they were already known to be present. Among these, to mention only three, alfalfa bacterial wilt (*Corynebacterium insidiosum*) was found for the first time in the main alfalfa seed producing areas in Minnesota, its known range in Wisconsin also was extended northward, and in some other States it was found to be more prevalent and widespread than had been suspected. The onion bulb nematode (*Ditylenchus dipsaci*), which has been known for some time on a few farms in two locations in New York, was found in another district for the first time, in a small portion of one field. Careful surveys in Oklahoma showed that the omnivorous root rot organism, *Phymatotrichum omnivorum*, affected a somewhat larger area than had previously been determined in that State.

The detection of new and potentially important sources of damage and the contributions to plant disease geography constitute only one aspect of the assistance given by the Emergency Program to crop production. In many activities the Project supplemented and cooperated in the work of established Federal and State agencies in studies on the epidemiology, incidence, and importance of specific plant diseases, forecasts and warnings of probable disease development during the season, identity and cause of obscure diseases, and determination of subjects requiring attention from research or extension workers. Reports of the Project field men usually did not mention the practical use made of their observations, but Barss (Some results of value to States from the Emergency Plant Disease Prevention Program in 1943 and 1944, compiled by Howard P. Barss. Unnumbered mimeographed publication issued by Office of Experiment Stations, U. S. Department of Agriculture) has compiled a list based on a questionnaire to heads of plant pathology departments at the State Experiment Stations, and Chupp also discussed some specific instances (Ways in which the Emergency Plant Disease Prevention Program aids extension. Plant Dis. Reptr. Suppl. 152: 3-5. Jan. 15, 1945).

Accomplishments of this portion of the Emergency program are illustrated by the following examples selected from hundreds of similar cases. They show that the plant disease situation during these war years presented opportunities for some exceptional services on the part of the Emergency organization.

That most famous and temperamental of plant disease actors, late blight (Phytophthora infestans), put on a sensational show in Southern States during the winter and spring, 1943-44. This performance rates headlines for its vivid interpretation of the varied interrelations of plant disease importance, not only in immediate, but in future consequences. It is not too far-fetched an assumption that the heavy late blight infection in 1943-crop northern seed potatoes planted in the South was the primary factor in the building-up of tomato late blight infection, culminating in the outbreak that caused so much consternation in some Northern States in 1946.

The epiphytotic is an excellent illustration both of the importance a disease can assume in wartime, and of the effects of war conditions on disease incidence and spread. The severity of the disease, both North and South, was tied up with various heavy war-connected demands on the potato crop superimposed on the regular consumption requirements. This excessive demand, with a certain amount of late blight in some Eastern areas operating as a minor factor, accounted for the much-discussed potato "famine" of early 1943, according to Weiss (PDR 27 (9): 203-206. May 15, 1943). The shortage affected not only table stock but seed potatoes as well. In order to obtain seed for the greatly expanded acreage, certification requirements were relaxed and much seed was planted that ordinarily would have been rejected. The 1943 crop in Northern seed potato States suffered a widespread late blight outbreak, with heavy tuber infection; again, lowered standards were responsible for the planting of much of this infection-bearing seed in the South. In Southern States, weather ordinarily does not favor late blight regardless of seed infection, but during the 1943-44 season its cooperation assured the development of an outbreak, while control was hampered not only by grower unfamiliarity with the disease but by wartime scarcity and difficulty of obtaining control materials and equipment.

The disease was epiphytotic in every Gulf State from Texas to Florida, and north to South Carolina, and caused losses ranging from a quarter to half or more of the expected yield (Figure 1). In some of the affected areas, notably in Louisiana and Mississippi, it had rarely been present before.

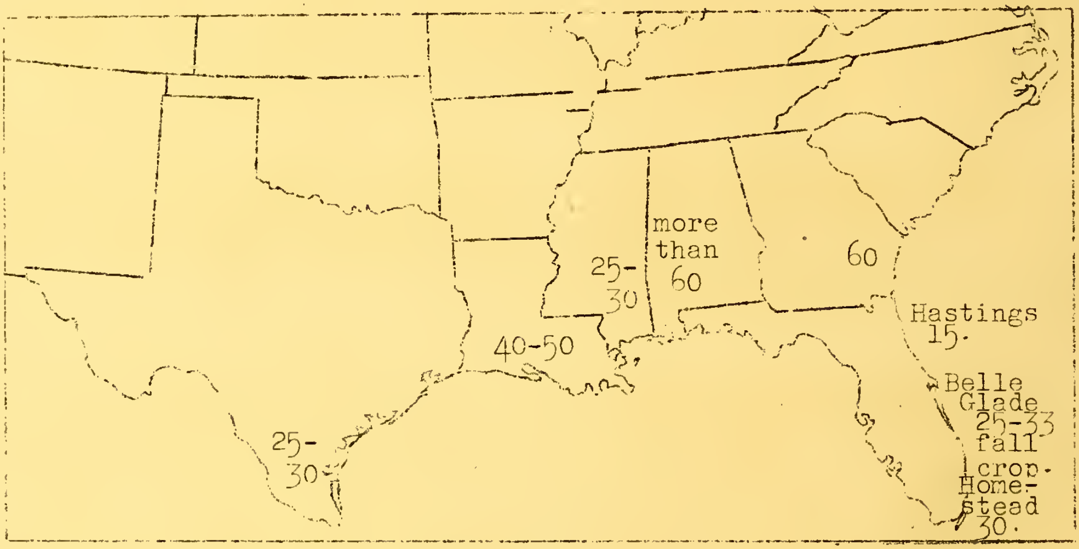

Figure 1. Estimated percentage loss from potato late blight during the 1943-44 epiphytotic in Southern States.

It is extremely unlikely that this outbreak could have been reported so completely and so promptly without organized effort. Observations on the appearance, development, and severity of the disease in Florida and Texas served as indication of its probable course in other Southern areas, if weather permitted, and alerted pathologists and growers in the absence of a warning service for this section of the country.

This southern outbreak furnishes a more concrete example of the application of current crop disease information to the forecasting of future developments. In the Lower Rio Grande Valley of Texas late blight was found to be widespread on the fall crops of both potato and tomato in late 1943 and early 1944. This was the first time in several years that the disease had occurred on tomatoes in the Valley. The significant feature of its prevalence on the relatively small fall crop was the danger to the important spring crops, which were just being planted at that time and which overlapped the fall crops during the early stages of growth. The threat was so serious that growers were warned in time to undertake preventative measures. On the basis of this advance information a leading fungicide and insecticide dealer increased his fungicide order by a considerable amount[3]. The warning was fully justified by later developments. Weather remained favorable during the next three months and by March the disease had increased to epiphytotic proportions. In most undusted potato fields all of the foliage had been killed and the stems were dying by the middle of March, with a total loss of the crop of affected plants, since most were just approaching the flowering stage. The effectiveness of dusting was strikingly evident, but even with the stimulus for greater control activity only about half of the 10,000 acres planted to potatoes in this section were dusted.

The South was not the only area in which the Emergency Project contributed to the fight against late blight. Project field men in some States aided materially in the warning service conducted by the Upper Mississippi Valley Plant Pathologists' War Emergency Committee, both in field inspections and in a considerable amount of anonymous assistance in summarizing and correlating information on weather and disease occurrence.

The prominence during these years of some widely distributed plurivorous fungi and viruses, notably Macrophomina phaseoli (Sclerotium bataticola), Sclerotinia sclerotiorum, and the aster yellows virus, might not have been brought out without the aid of the Emergency Program, particularly since wartime conditions would have tended to reduce observations and reports in the absence of an organized effort to obtain them.

Distribution reported for Macrophomina phaseoli is shown in Figure 2. East of the Mississippi the records represent scattered occurrences on one or two hosts. In the Central and Southern Plains regions the root rot of corn and sorghum was apparently more prevalent and severe

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[3] In this connection, a substantial contribution was made by the field staff of the Emergency Project through close cooperation with the Chemical Division of the Chemical and Fertilizer Branch, Office of Materials and Facilities, War Food Administration. The Emergency staff acted as "official spotters" by furnishing information relative to approaching epiphytotics and local shortages of fungicides to the Chemical Division, which was charged with the responsibility for seeing that insecticides and fungicides were properly distributed to points where they were most needed by farmers. As a wartime conservation measure this activity repeatedly proved its worth.

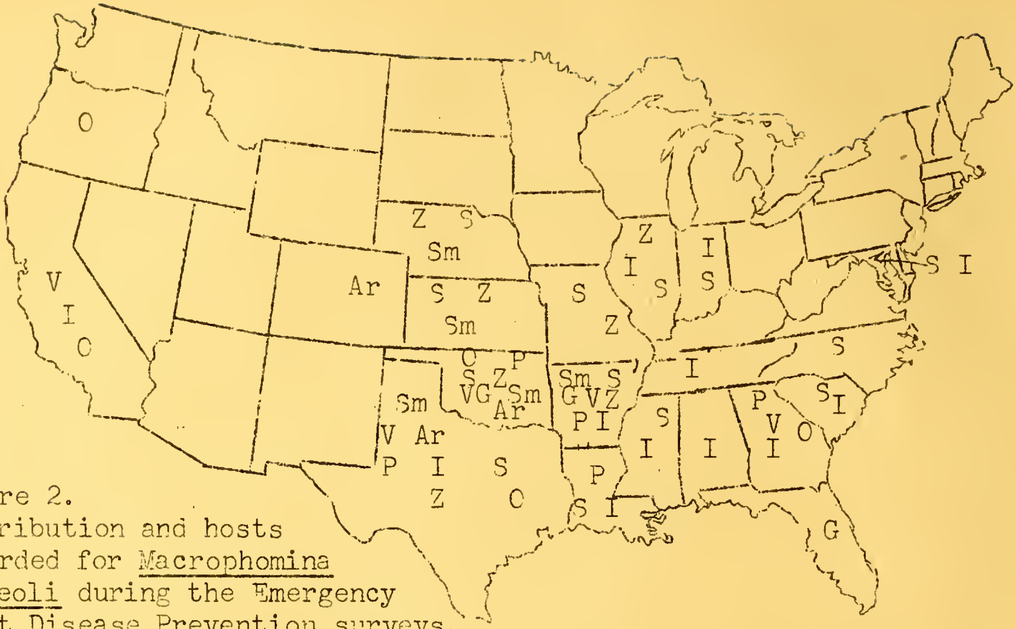

Figure 2.
Distribution and hosts recorded for Macrophomina phaseoli during the Emergency Plant Disease Prevention surveys.
Hosts: S (Soja), soybean; Sm (Sorghum), sorghum; V (Vigna), cowpea; Z (Zea) corn; P (Phaseolus), bean; I (Ipomoea) sweetpotato; Ar (Arachis) peanut; G (Gossypium) cotton; O, other hosts.

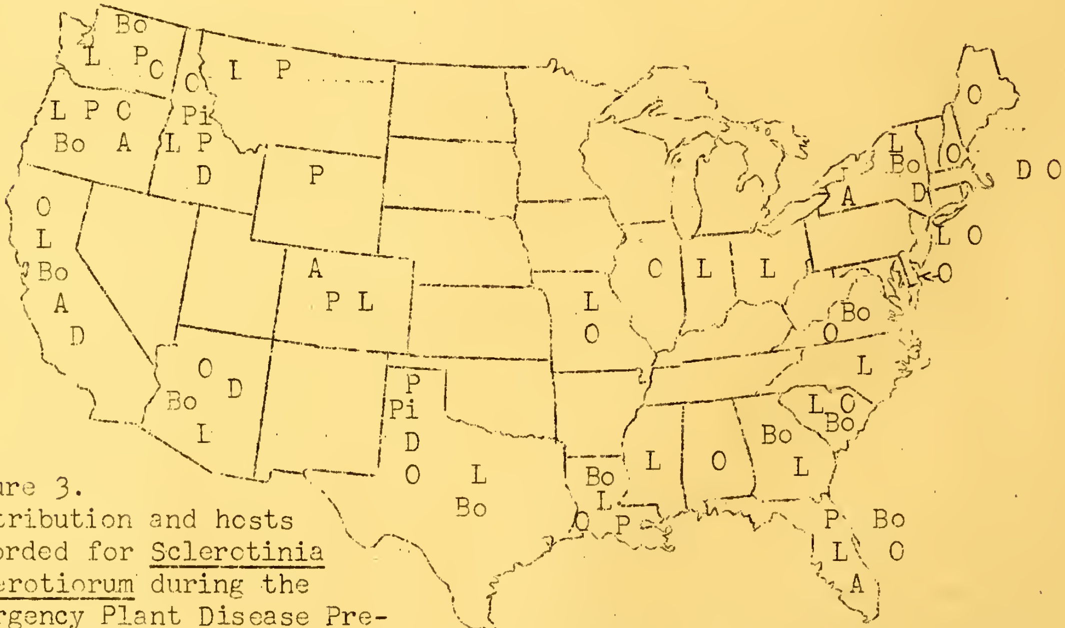

Figure 3.
Distribution and hosts recorded for Sclerotinia sclerotiorum during the Emergency Plant Disease Prevention surveys. Hosts: L (Lactuca), lettuce; P (Phaseolus), bean; Bo (Brassica oleracea), cabbage and its relatives; A (Apium), celery; Pi (Pisum), peas; D (Daucus), carrot; O, other hosts.

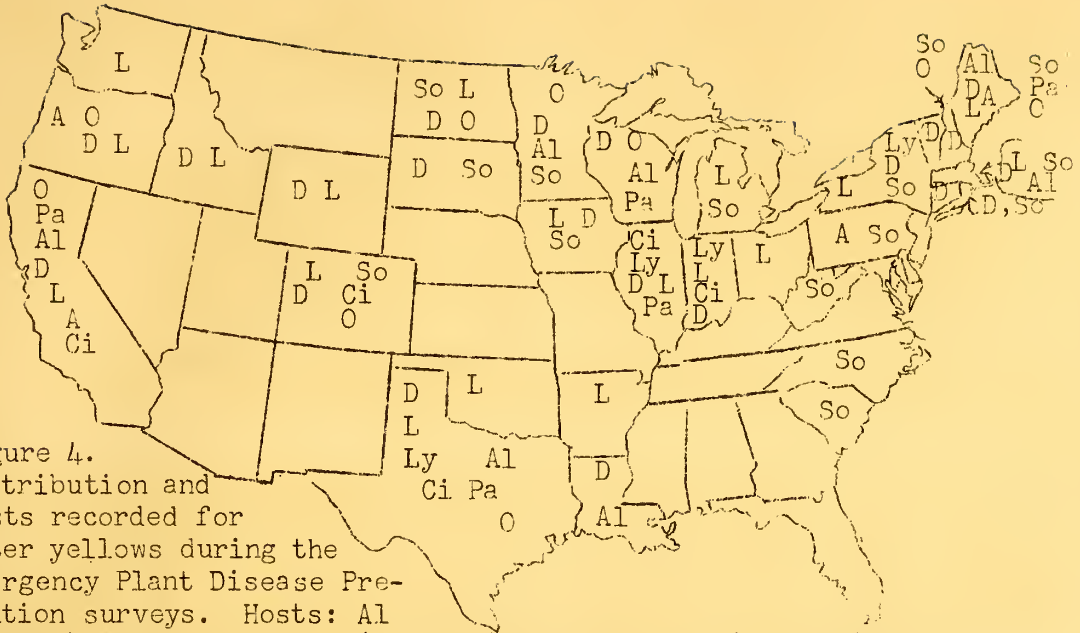

Figure 4.
Distribution and hosts recorded for aster yellows during the Emergency Plant Disease Prevention surveys. Hosts: Al (Allium), onion etc.,; L (Lactuca), lettuce; So (Solanum) potato; A (Apium), celery; D (Daucus) carrot; Ly (Lycopersicon), tomato; Ci (Cichorium), endive, escarole; Pa (Pastinaca), parsnip; O, other hosts

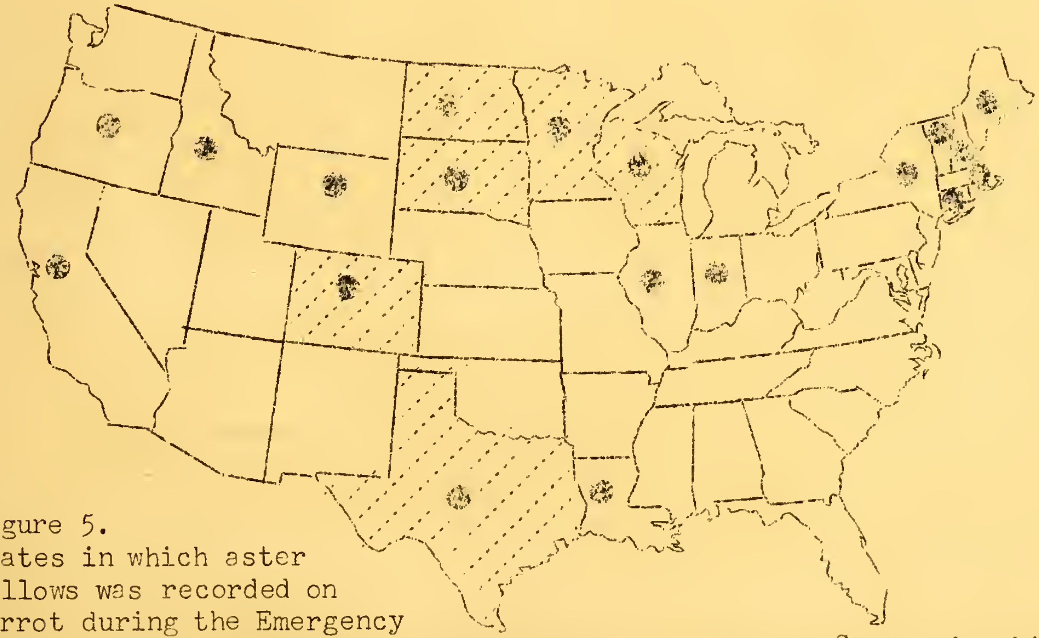

Figure 5.
States in which aster yellows was recorded on carrot during the Emergency surveys. Dots indicate occurrence; shading indicates States in which the disease was reported as a major factor in carrot growing.

than usual. In Oklahoma and north and east Texas incidence of the organism on numerous hosts amounted to an epiphytotic outbreak. The discovery of the fungus for the first time in Oregon marks a wide jump in its known distribution.

Although Sclerotinia sclerotiorum is widespread and important as the cause of various types of diseases on a wide range of hosts, it is seldom so generally recorded during any one year as it was during this survey (Figure 3). Outbreaks were recorded from Florida to Idaho, especially on beans, peas, lettuce, and cruciferous crops.

Aster yellows occurred widely on numerous hosts, (Figure 4) and was reported as a major disease in carrot-growing areas of several States (Figure 5).

As an example of intensive watch over the development of a disease in a limited crop region, the observations on aster yellows in the important carrot plantings in the Winter Garden region of Texas are outstanding. An outbreak characterized by Ivanoff and Ewart (PDR 28 (32): 972-979. Oct. 7, 1944) as "unprecedented" caused very heavy loss there during the 1943-44 crop season. Infection ranged from none in very young plantings to more than 80 percent in nearly mature fields, averaging 30 percent or more throughout the period. Increase in the staff of the Emergency survey in Texas winter crop areas by transfer of field men from more northern regions enabled cooperation in practically continuous inspection of carrot plantings, beginning with November when loss became so obvious as to alarm the growers. The surveys accumulated a fund of information on carry-over of the virus from one crop season to another; relation of infection to age of planting, abundance of insect vectors, and prevalence of infection in other hosts, especially weeds; effect of disease on roots; amount of loss from specific degrees of infection; varietal reaction; -- all subjects of fundamental importance to research and control programs and for determining the probable course of the disease in future seasons.

Another intensive series of surveys, during which regular examinations were made of vegetable farms in northern New Jersey, resulted in the discovery of an unusual seedling trouble of lettuce, eggplant, and pepper, caused by a fungus identified as a species of Aphanomyces. The disease, although destructive, was so restricted in distribution and so limited in duration that it might very well have been missed entirely except for the frequent inspection of plants from seedling stage to maturity (see Table 2).

Some examples representative of the type of fundamental information gained from surveys in various regions may be mentioned briefly. Virus diseases were shown to be more widely distributed and more common in Utah stone fruit orchards than had been realized, and a reliable method was established of diagnosing rusty mottle of sweet cherry in the absence of the typical symptoms. Much progress was made toward determining the factors associated with the cause and spread of decline in citrus and avocado groves in California. Results of the nematode survey in Florida and other Southern States showed that, besides the root knot nematode, Heterodera marioni, many other plant parasitic forms about which very little is known are widespread and probably of considerable importance. A survey in Virginia and West Virginia showed that the meadow nematode, Pratylenchus pratensis, was very widely distributed and that it was constantly associated with winter browning of boxwood and probably was involved in much of the so-called winter injury of many plants. Bad infestations of both the root knot and meadow nematodes were found on celery in Oregon in locations where neither had been recognized as a cause of loss. Peanut disease surveys in the Carolinas, Georgia, and Alabama added a great deal to the available information on distribution of peanut diseases, varietal reaction, fungi associated with peg rot and nut rot in field and storage, and methods of harvesting and storage to reduce losses from nut deterioration.

A new approach to the control of seed-borne organisms causing seedling diseases and root rots of small grains was instituted by the Emergency work in Minnesota and the Dakotas. Seed of barley, oats, wheat, and flax, originating in widely distributed regions of these States, were cultured to determine whether the particular organisms present were of types that could be controlled by seed treatment and whether they occurred in such concentration as to justify treatment. This project produces long-range, not merely immediate, benefits, through saving expense of unnecessary seed treatment, preventing controllable losses in regions where seed treatment is advisable, and perhaps gradually eradicating some of the sources of loss.

Some of the most important contributions made by the Emergency Program pathologists were the intensive studies of stored crops. Direct importance to the war effort resulted from the conservation of much produce that otherwise would have been lost. For example, in Rhode Island a special study of rot and other disease conditions of potatoes in storages under the control of the War Food Administration enabled the local officials to move to market first the potatoes most subject to spoilage.

Of greater significance in the long run, however, was the better understanding of the whole storage problem made possible by the comprehensive information gained from these observations on storage construction and management, condition of crops as they went into storage, types of diseases present and their relative prevalence at different durations and under varying treatment in storage. Chupp (PDR Suppl. 152: 3-5. Jan. 15, 1945) points out that, whereas hitherto the need for investigation of storage problems had been recognized in a general way, the Emergency Program studies raised specific questions for extension and research workers to answer.

Naturally, because of the widespread production of the crop, most general attention was paid to potatoes in the storage surveys. Potatoes were particularly affected by storage deterioration during the 1943-44 season. Repeated examinations in Maine demonstrated this especially well. Poor harvesting conditions, rough handling by scarce and inexperienced help, overloaded and improvised storages, aggravated the effects of rot-producing organisms and resulted in very heavy loss.

In Idaho, on potatoes in field and storage, either a new disease or a new serious aspect of a disease was found, to which the term "water rot" was applied. Repeated isolations from typical samples yielded a fungus identified at the Stillwater Laboratory as Phytophthora erythroseptica. In some fields at digging time as many as 50 percent of the tubers showed this trouble, and the amount of rot increased in storage. The cause of a similar trouble observed in Minnesota and the Dakotas has not been assigned as yet.

Seed potatoes, as well as table stock, in storage were examined. In one county of Wisconsin it was found that more than 60 percent of the potato growers were harboring bacterial ring rot (Corynebacterium sepedonicum) in their seed stocks. In close cooperation with the Wisconsin Extension Service and with research men, a special campaign was inaugurated to prevent the presence and spread of this disease. This study, which was conducted during two seasons, consisted of numerous storage inspections and interviews with the growers in which the importance of disease-free seed stock and sanitation as control measures was emphasized. The program was welcomed by all having to do with potato production in this area, and it doubtless contributed much toward increasing both the quality and quantity of the crop.

Other stored crops were not neglected. In various States, storage conditions affecting sweetpotato, squash, onions, carrots, celery, cabbage, rutabagas, apples, and pears were studied. In New York a series of particularly comprehensive and detailed investigations included both vegetables and fruits.

In this category of storage problems may be considered the serious difficulties presented by the 1944 corn crop in Iowa and Nebraska. A high percentage of the unusually large crop was immature and therefore especially subject to molding, while the size of the crop rendered storage facilities inadequate and much of the corn was stored in temporary cribs or piled in heaps on the ground. Damp weather aggravated the moisture situation; size of the crop and shortage of transportation prevented prompt shelling and marketing. In cooperative work with State officials, Survey pathologists gathered data on storage conditions, moisture content, kinds and amount of molds present, and rate of spoilage, that resulted in recommendations for handling in such a manner as to use up the wettest corn first and to arrange storage to allow maximum ventilation, thus reducing molding as far as possible. Nevertheless, heavy loss resulted.

Appropriate material to illustrate the contributions of the Emergency Plant Disease Prevention Project might equally as well have been taken from many other examples instead of or in addition to those selected. It is impossible to mention, even briefly, all of the individual accomplishments. The foregoing account seems to us to include a representative choice. Reports of the surveys as they were made are published in the PLANT DISEASE REPORTER, beginning with Volume 27, number 15, 1943, through Volume 29, 1945.

CONCLUSIONS

In conclusion, it appears that the Emergency Plant Disease Prevention Program, in addition to its protective feature, was of definite value to wartime American agriculture by increasing the effectiveness of plant disease control programs throughout the country. It discovered previously unrecognized sources of severe crop losses, and by cooperating with research and extension agencies was instrumental in the application of control measures that will prevent recurrence of these losses in the future. In certain cases where effective control measures were not available the recognition of the trouble led to the undertaking of research designed to work out practical methods. The project also increased the effectiveness of disease control by early discoveries of incipient epiphytotics, and through a prompt forecasting service thus insured the application of preventive measures before it became too late. A number of new and potentially destructive diseases were discovered. They were called to the attention of the proper research and quarantine agencies so that they might be studied and watched as a necessary precaution against future losses.

APPENDIX

Shortly after the termination of the Emergency Plant Disease Prevention Project, members of the field staff were asked to prepare brief statements of what they considered to be the outstanding results of their efforts and to evaluate the non-confidential phases of their work. In keeping with the scheme adopted for the preceding text only selected parts of a few representative reports are given.

THE EMERGENCY PLANT DISEASE PREVENTION PROJECT IN IDAHO[1]

Earle C. Blodgett

The principal emphasis of this survey was placed on diseases affecting Idaho's main crops: potatoes, beans, wheat, alfalfa, fruits, vegetables and vegetable seeds. An actual appraisal of the value of the project is very difficult, and it is possible to indicate only briefly and generally some of the principal phases involved.

Probably the disease problem that was of the greatest interest and importance was the one on potatoes caused by a certain species of nematode, discovered on October 26, 1943, near Aberdeen. Since this discovery was due primarily to the Emergency Plant Disease Prevention Project the ultimate, intricate, and important ramifications may be credited to this Program. These may be listed as follows:

1. A disease was recognized as new to the United States and hence of considerable importance.

2. The causal agent was an undescribed species of nematode well known in Europe but previously confused with the bulb and stem nematode, Ditylenchus dipsaci.

3. The nematode was given the common name potato rot nematode, and the specific name Ditylenchus destructor Thorne, 1945. (Thorne, Gerald. Proc. Helminth. Soc. Wash. 12 (2): 27-33. 1945.)

4. A Nematode Control Committee composed of representatives of the U. S. Department of Agriculture, the Idaho Extension Service, the Idaho Agricultural Experiment Station at Moscow, the Aberdeen Branch Station at Aberdeen, the Idaho State Department of Agriculture, potato growers, potato dealers, and the Idaho Advertising Commission, was appointed by the Vice-Director of the Idaho Agricultural Experiment Station.

5. Extensive plans were set up for detailed surveys, strict control measures, and an intensive research program.

6. To furnish means for conducting this program, the Idaho State Legislature, in House of Representatives Bill No. 192 of the 28th Session, established the Plant Pest Control and Research Commission composed of the Governor, the Vice-Director of the Idaho Agricultural Experiment Station, and the Commissioner of Agriculture,

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[1] This note is written with the approval of the Plant Pest Control and Research Commission, State of Idaho

and authorized it to administer a $50,000 appropriation, half of which was set aside for research and for control of the potato rot nematode. Funds set aside by the U. S. Department of Agriculture, the Idaho Agricultural Experiment Station, the Aberdeen Branch Station, and the Idaho Advertising Commission brought the total to approximately $40,000 for the nematode program for a two-year period.

7. The entire control program recommended by the Committee was on a voluntary basis under strict requirements as to crop rotations and tuber disposal. It is quite certain that this method was as effective as quarantine measures would have been, and possibly more effective.

8. The research program was under the supervision of the writer in close cooperation with Gerald Thorne of the U. S. Department of Agriculture. The program included studies on crop rotations, variety testing, indexing land as to infestation, detailed surveys, and chemical control measures. In addition, a new water screening apparatus was designed and built, and operated to furnish new, fundamental information on transportation of nematodes by waste water from nematode-infested fields.

9. While much more remains to be learned through continued research it appears that the disease is well under control both from the standpoint of crop loss and of danger of spread.

The Survey Project from its very beginning has shown the value of cooperation. Close contact and counsel has been maintained with the members of the Western Plant Board and sound measures have been insisted upon to safeguard this State as well as others from the nematode disease. The establishment of a Plant Pest Control and Research Commission for Idaho was a very desirable step forward and probably would not have been accomplished without the emergency demands of the potato rot nematode problem.

The information gained through the Survey and in later work has called attention to the importance of the heretofore more or less neglected problems connected with the root knot and sugar beet nematodes. Recent developments indicate that the Nematode Control Committee will be responsible for an over-all nematode control program in the State. Improved practices in sugar beet dump dirt disposal will undoubtedly be established soon by the Committee's cooperation with the sugar company in designing new methods and machinery for the handling of this dirt, which is one of the principal methods by which nematodes, noxious weeds, and other pests are distributed from farm to farm.

The Survey can be credited with determining the cause of "water rot" of potatoes, with increasing the information on potato storage diseases, with determining the cause of typical shell rot of potatoes. In general, it has furnished a good background for revision and concentration of efforts on research or extension problems in many phases of agriculture in the State. It is believed that the Survey was a direct benefit and filled a timely need.

HIGHLIGHTS OF THE EMERGENCY SURVEY IN KENTUCKY AND TENNESSEE

Russell A. Hyre

A most important contribution of the Survey was the obtaining of a comprehensive picture of the disease situation that could serve as a reliable basis for making adjustments in the research program to best meet the needs of the farmers. For instance, in western Tennessee, sweetpotato growers felt that if more help was not forthcoming stem rot (Fusarium) might deprive them of this important cash crop. Average yearly losses from stem rot now amount to 20 to 25 percent.

The educational contribution as a result of the Survey, in this area which lacked an extension pathologist, was considerable. Farmers, county agents, and others eagerly welcomed information on their plant disease problems.

The survey uncovered a leaf spot of corn caused by Cercospora zeae-maydis which was unreported from the Kentucky-Tennessee area and which, as far as is known, had been reported previously only from Illinois. The disease was found in ten counties in eastern Tennessee and Kentucky, seven in Tennessee and three in Kentucky. It occurred in severe form in some cases and was found on hybrid corn as well as on the open-pollinated varieties.

THE EMERGENCY SURVEY IN KANSAS

S. M. Pady

As far as Kansas is concerned, the most valuable contribution made by the Emergency Plant Disease Prevention Project was in obtaining complete data on the number, distribution, and prevalence of diseases known to be present in the State. Special emphasis was placed on the cereal diseases, and complete and detailed records were obtained on prevalence, particularly with regard to crop losses. For example, the milo disease of sorghums had previously been reported from only fifteen counties in western Kansas. Our surveys showed it to be present in eighteen counties widely distributed over the western part of the State. Bunt of wheat was found to be present in the State in amounts small but sufficient to emphasize the importance of continuing seed treatments. Anthracnose of oats was reported for the first time and was found to be severe in 1945 on oats in southeastern Kansas. The new bacterial leaf spot and top rot of corn was found in trace amounts in many fields of eastern Kansas, but was particularly severe in certain inbred lines in seed production plots.

THE EMERGENCY SURVEY IN VIRGINIA AND WEST VIRGINIA

Carlton F. Taylor

I believe that the most important function of the Survey in this section was to supplement the activities of State workers in covering areas not normally visited by them. However, this was a decidedly non-spectacular phase.

In Virginia and West Virginia farms were selected at random along routes chosen to pass through areas of the most intensive cropping, such routes frequently being suggested by the County Agricultural Agent or other State worker. At each stop all available crops were examined and the farmer was encouraged to discuss any unusual crop troubles encountered either by himself or by his neighbors. By such means a boron deficiency disease of rutabagas causing an estimated annual loss of $20,000 in western Virginia was discovered. This information was placed at the disposal of the members of the Department of Plant Pathology at Virginia Polytechnic Institute, whose experiments during the following season confirmed the diagnosis and demonstrated that excellent control could be obtained by the addition of small amounts of boron.

ACCOMPLISHMENTS OF THE EMERGENCY SURVEY IN MINNESOTA AND THE DAKOTAS

Ian W. Tervet

Some of the most important benefits from the Emergency Program to the farmers resulted from the utilization of the knowledge obtained by the extension services to give more accurate controls for certain of the most important diseases. The surveys on the seed microflora of small grains proved of great value in emphasizing the continued need for seed treatment. Field surveys on cruciferous field crops indicated that much of the seed used was affected with pathogenic organisms, especially the black rot bacterium. This information led to the development of an extensive and successful hot water seed treatment campaign in Minnesota by Extension Pathologist R. C. Rose. Another major contribution was the rather detailed survey made on the presence of aster yellows virus on weeds and vegetable crops.

The surveys on purple top wilt and hair sprout of potato focused attention of some of the research workers on these problems.

The Survey observed and recorded a severe epiphytotic of pasmo disease of flax. Pasmo had caused only nominal loss since its introduction about 25 years ago until the summer of 1943. During that year, yellow-seeded varieties in southeastern North Dakota were destroyed and even the more resistant varieties such as Bison were severely injured in eastern South Dakota and Minnesota, losses to Bison running in excess of 50 percent in some fields.

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THE PLANT DISEASE SURVEY

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AGRICULTURAL RESEARCH ADMINISTRATION
UNITED STATES DEPARTMENT OF AGRICULTURE

SUPPLEMENT 168

DISEASE SURVEY OF SOYBEAN NURSERIES IN THE SOUTH

Supplement 168 June 1, 1947

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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DISEASE SURVEY OF SOYBEAN NURSERIES IN THE SOUTH[1]

J. L. Weimer[2,3]

Plant Disease Reporter
Supplement 168

June 1, 1947

INTRODUCTION

During the past three summers (1944-1946), a survey has been made of the diseases occurring on the varieties and strains of soybeans in the regional nurseries grown as a cooperative project between the U. S. Regional Soybean Laboratory, Urbana, Illinois, and the State Agricultural Experiment Stations in the South.

All regional uniform nurseries consist of 20-foot randomized rows of each variety tested replicated four times. They are in charge of a Station or a cooperating Federal Agronomist and are located at the Experiment Station and at one or more field stations in some States. At many stations the cooperator in charge of the nursery assisted in taking the notes. The States covered by this survey include Alabama, Georgia, Louisiana, Mississippi, and one station in South Carolina.

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[1] Cooperative investigations of the Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture, and the Georgia Agricultural Experiment Station. Paper No. 165, Journal Series, Georgia Agricultural Experiment Station.

[2] Senior Pathologist, Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture.

[3] Cooperators to whom credit is due for assistance in obtaining the data presented herein at their respective stations are Mr. P. R. Henson, Dr. H. W. Johnson, and Mr. R. B. Carr, Stoneville, Miss., Dr. S. J. P. Chilton and Dr. J. P. Gray, Baton Rouge, Louisiana, Dr. Coyt Wilson and Mr. E. F. Schultz, Auburn, Alabama, Mr. J. L. Stephens, Tifton, Georgia, and Mr. W. E. Adams, Watkinsville, Georgia, and Dr. U. R. Gore, Experiment, Georgia.

For their convenience, the cooperating agencies have arranged the soybean varieties used in the uniform nurseries in groups numbered from 0 to VIII according to maturity. Groups 0 to IV-S are grown largely in the north and central sections of the United States and Groups VI to VIII are grown in the Southern States. This survey was concerned largely with Groups VI to VIII; but, because of the interest in parts of the South in soybeans that mature early in September, the varieties and strains of Group IV-S were grown at a number of locations. Through the mid-South, the soybeans of Group VI normally mature from October 1 to 15; those of Group VII, October 16 to 30; and those of Group VIII after November 1. Usually two or more groups were grown at a location.

It is, of course, understood that the data presented in this paper are of such a nature that, at least for the most part, only tentative conclusions can be drawn. Some of the data presented, however, are highly suggestive and indicate quite clearly in what varieties resistance may be found. The proper rating of the varieties intermediate in resistance can only be determined by careful experimental testing. This is true largely because of the scarcity of disease in some nurseries and a lack of uniformity of infection in others.

METHODS

Readings were made on one or two dates each year. Since time would not have permitted making counts, even if that had been considered worth while, the relative resistance of the varieties was determined by inspection only. There was so much variation in the stage of development of the diseases present at the different locations as a result of differences in date of seeding, soil type, geographical location, and other factors that it did not seem practical to make too close readings. For this reason ratings on a scale in which 0 = no disease, 1 = very slight, 2 = medium, 3 = considerable, 4 = severe, and 5 = very severe were adopted. Occasionally an intermediate reading seemed justified and then a rating of 1/2 was used (e. g., 2 1/2, 3 1/2, etc.). Such ratings are, of course, arbitrary and their value naturally varies with the observer. The ratings presented in this paper were checked on numerous occasions by other pathologists and agronomists and, for the most part, there was close agreement among the different ratings. When practical the readings were made by two persons; and, if these were at variance, an agreement was reached. All the readings at each location were made the same day, but those at different locations covered a period of a little over a month. This fact must be taken into consideration in appraising the data, since the diseases usually became progressively more severe as the season advanced.

RESULTS

So many figures have been obtained during the past three years that it is not feasible to present all of them. For this reason only the readings for pustule-blight, frogeye, wildfire, and mosaic made in 1946 are given in detail (Tables 1-12) and the data for the three years are summarized (Tables 13-16). The data in Tables 1-12 are typical of those obtained for all three years. No readings are recorded for certain varieties at some locations because such varieties were missing, usually as a result of a shortage of seed. The data are presented under the heading of the different diseases.

Bacterial Pustule-Blight Complex

The most widespread and prevalent of the diseases encountered were the bacterial leaf spots, bacterial pustule (Xanthomonas phaseoli var. sojense (Hedges) Starr & Burkholder), and bacterial blight (Pseudomonas glycinea (Coerper) Stapp). The symptoms of these two diseases are so similar, especially in late stages of development, that they were rated as one disease. For the most part, pustule appeared to be far more prevalent than blight although some varieties are very susceptible to the latter. The data in Tables 1-3 and those dealing with pustule-blight in Tables 13-16, therefore, represent a mixture of pustule and blight. Since these two diseases are considered as one, the name pustule-blight seems appropriate.

A study of the data for Group VI (Table 1) shows that there is a variation of two or three points in the ratings of replications at a location, but more commonly the variation is not greater than one point. In 26 percent of the nurseries the readings were the same for all four replications. The two readings given for Stoneville, Mississippi, were made on plots planted on two different dates, namely, on April 18 and May 29, respectively. The earliest readings for the season were made at Tallassee, Alabama, on July 22 and the latest at Watkinsville, Georgia, on August 30. The planting at Tallassee had little disease at the time the readings were made. At Fairhope, Alabama, the readings ranged from 1 for Ogden and Dortchsoy #2 to 5 for Burdette #19. As might be expected, there was a slightly higher average reading in the earlier planting at Stoneville. The ratings at Watkinsville were influenced by two factors, namely, drought and insect damage, which, at least in part, account for the lower readings. As was usually the case, the readings at Baton Rouge, Louisiana, were higher than elsewhere, being influenced largely by high rainfall at that location. It should be pointed out that Ogden, a variety usually freer of disease than most of the others, rated fairly high at Baton Rouge, although it still had less disease than all of the others except Dortchsoy #2. These two varieties gave what appeared to be significantly lower average readings and may be considered as possessing some resistance to pustule-blight.

Some of the points noted above for Group VI (Table 1) also apply to Groups VII and VIII (Tables 2 and 3). For example, there was little pustule-blight at Tallassee, but the disease was prevalent at Stoneville and Baton Rouge. Since Groups VII and VIII were more widely planted than Group VI, additional locations appear in these tables. The diseases were quite prevalent at Tifton, Georgia; Blackville, South Carolina, where there were two dates of seeding; and at Fairhope. With a few exceptions the diseases were slightly more severe at Blackville in the early planting. Ogden, which was the only variety repeated in Group VII, again rated lower than most of the others and must be considered in a class with Palmetto and C-N-S. In Group VIII Cherokee and Louisiana Green showed the most resistance. Louisiana Green appeared to be outstanding in its resistance to these diseases even at Baton Rouge where Ogden and C-N-S sometimes showed considerable disease. This is the first year (1946) observations were made on Louisiana Green, however, and, even though it looked exceedingly promising, final judgment as to its resistance must be withheld for the present. Observations over a period of years have shown that a variety that appears to be relatively resistant one year does not necessarily appear so in succeeding years.

Wildfire

Wildfire (Pseudomonas tabaci (Wolf & Foster) Stapp) seems to be increasing in importance from year to year. At least that has been true in some plots observed by the writer during the past three years. This disease is erratic in its appearance, often being severe at one end or at the center of a row and absent from the other parts. This has made it difficult to rate the severity of the disease accurately. In general, however, those with whom the matter was discussed agreed that the part of the row most severely affected represented the resistance of the variety, the absence of the disease from the remainder of the row being attributed to lack of inoculation. The ratings, therefore, were based on the part of the row most severely affected.

The data in the Tables 4-6 show that there was no wildfire at Fairhope, Alabama, in the 1946 nursery except for a trace in one row each of Mamotan and Gatan in Group VIII (Table 6). In Group VI the disease was most severe at Stoneville, Mississippi, with the exception of a few rows at Watkinsville, Georgia. The same is true in Group VII (Table 5). In Group VIII wildfire was most severe at Stoneville, and at Tifton,Georgia. Even at locations where wildfire was not severe it varied greatly on different varieties. For example, in Group VII Roanoke, Volstate, Wood's Yellow, and P.I. 54618-4-1-2 were the only varieties severely affected, and in these varieties the degree of infection sometimes varied from 0 to 3 in different replications at the same location, suggesting a lack of uniformity in the distribution of the inoculum. In Group VIII Mamloxi, Acadian, Mamotan, Nanda, and Coker's Selection #433 were most severely affected. If any varieties are to be selected as resistant on the basis of the data presented in Tables 4-6 they are Ogden, Dortchsoy #2, F. C. 30261-1, Palmetto, C-N-S, Cherokee, and Louisiana Green.

Frogeye

In general, frogeye (Cercospora sojina Hara) was not severe in 1946, except in some varieties at Baton Rouge, Louisiana, and at Stoneville, Mississippi. Three varieties in Group VI, Ogden, Rose Non-pop, and Burdette #20, and three of Group VIII, Acadian, Gatan, and Cherokee, were medium to very severely affected at Baton Rouge. In Group VII six varieties, N44-774, Palmetto, C-N-S, N42-26, N44-92, and Red Tanner, were medium to very severely affected at Baton Rouge. The last three of these varieties were moderately diseased at Stoneville, but the other three had no frogeye or only a trace of the disease. This, together with the fact that in Group VI Ogden was listed among the susceptible varieties at Baton Rouge and in Group VII it was not, indicates that caution is necessary in drawing final conclusions regarding resistance to frogeye.

Mosaic

Each year observations were made on the presence of mosaic, but there was so little of the disease in most places that the data for 1946 only are given (Tables 10-12). The disease was most evident at Tallassee, Alabama, where there was a trace in all varieties and where a few were moderately affected. The most seriously affected varieties observed in 1946 (having an average rating of 1.0 or over), were Rose Non-pop, Burdette #13, Palmetto, Nanda, Mamotan, Gatan, Seminole, C-N-S, Acadian, N44-774, N44-92, Cherokee, Red Tanner, Mamloxi, and Louisiana Green. If any variety is to be classed as resistant on the basis of these data, especially the ratings at Tallassee, it is Ogden, and possibly Dortchsoy #2, although neither is immune.

Summary of Data for 1944-1946

Having observed the nature of the data secured and the variations obtained in the different replications and locations, the summary tables following should be largely self-explanatory. These tables give the averages of the readings for all locations for pustule-blight, wildfire, frogeye, and downy mildew. Table 13 gives the data for Group IV-S. In this Group in 1944 Chief appeared to show some resistance to pustule-blight, but this was not confirmed in 1945. The figures fail to indicate that any variety in this Group is appreciably resistant to pustule-blight. The data for wildfire indicate that S100 and Gibson are more susceptible to wildfire than some of the others; but, as in the case of pustule-blight, there is no satisfactory evidence of resistance. The data for the three years seem to support the statement made previously that wildfire is increasing in severity. The average amount of wildfire found on all varieties in 1944 was small. There was a slight increase in 1945, especially in S100 and Gibson; and a further increase in these varieties, as well as in some others, in 1946. No data for frogeye were obtained for Group IV-S in any of the three years. Downy mildew [Peronospora manshurica] was seldom present in more than trace amounts, but sometimes it did appear in considerable abundance on certain varieties. This disease was of so little importance in 1944 that no notes were taken except on Group IV-S. In 1944, S55-10 and S55-35 rated an average of 1.0 and 1.8, respectively, whereas all of the other varieties rated below 1.0. No mildew was found on Chief either in 1944 or 1945, indicating that this variety may be resistant.

Table 14 gives the corresponding data for the three years for Group VI. In this group Ogden possessed the highest degree of resistance to pustule-blight in all three seasons, being equaled only by Dortchsoy #2 in 1946. The data for wildfire showed much the same thing. Here again Ogden rated most resistant. Dortchsoy #2 was second in 1946, the only year it was tested. The differences between the ratings for these varieties and those of the next in order, except possibly in 1946, however, are so slight that they probably are not significant.

A number of varieties in Group VI, namely, Arksoy, Ralsoy, 2-40A, 6-40M, Dortchsoy #2 and #7, and Burdette #13 and #19, appeared to be resistant to forgeye. Ogden, Burdette #20 and Rose Non-pop were especially susceptible in 1946. There was little more than a trace of downy mildew on any variety in Group VI in 1945 and 1946.

In Group VII (Table 15) Ogden, C-N-S, and Palmetto were most resistant to pustule-blight. Ogden rated most resistant to wildfire all three years. C-N-S rated high at Baton Rouge in 1944, otherwise it seemed to be as resistant as Ogden. The severity of wildfire on Palmetto at Baton Rouge in 1944 was responsible for its higher average rating in 1944 over those in 1945 and 1946. F.C. 30261-1 in 1946, and Rose Non-pop in 1944, received low ratings; but, since these were not rated other years, they cannot be considered as resistant without further confirmation. Most of the varieties in this group were only slightly affected with frogeye, but a few, such as Tennessee Non-pop, Rose Non-pop, Missoy, P.I. 89775-A, N44-92, N42-26, and Red Tanner, showed more disease than the others. Three varieties, namely Wood's Yellow, 26-39M, and C-N-S, had a medium amount of downy mildew, but no serious damage was done. Wood's Yellow was one of the most susceptible of the varieties observed. If the disease was present in a nursery at all, it could be found on this variety. Even on Wood's Yellow, however, the disease never caused sufficient damage to be of appreciable economic importance although the total functional leaf area was reduced somewhat.

In Group VIII (Table 16) Cherokee and Louisiana Green appeared to be the most resistant varieties to pustule-blight. Since only one year's readings for Louisiana Green are available, the resistance indicated must be considered as suggestive only. Where observed, however, this variety appeared to be outstanding in its freedom from the pustule-blight disease. Cherokee, Louisiana Green, and Avoyelles appeared to have more resistance to wildfire than the others in Group VIII. It appears from the data presented in Tables 13-16 that, if resistance to wildfire exists in the varieties studied, it is present in Ogden, C-N-S, Palmetto, Cherokee, and possibly Louisiana Green and Dortchsoy #2. These are the same varieties that rated most resistant to pustule-blight. This suggests that there might be a common factor for resistance to these bacterial diseases. Dr. W. B. Allington, who has made the most complete study to date of wildfire on soybeans, comments as follows in a letter to Dr. Howard W. Johnson on this subject;

"From what I have seen at various times, I would naturally expect a variety which has resistance to bacterial pustule to show much less wildfire. The conditions for infection with wildfire are very critical and this organism finds lesions such as a bacterial pustule a very suitable location for penetration. The presence of the pustules in that case merely tip the scale far enough to make wildfire infection possible. In certain situations, therefore, one may be led to suspect wildfire resistance in the same varieties that have pustule resistance, but it may not occur at all. Under other conditions, perhaps the same varieties would be completely susceptible."

What Dr. Allington suggests might happen appears to have taken place at Baton Rouge, Louisiana, in 1944 in C-N-S, which rated, 3, 4, 4, and 4 in the four replications. Under these same conditions Ogden rated 2, 1, 1, and 1, and Palmetto 2, 1, 2, and 3. Resistance of Ogden to pustule-blight likewise broke down under the same conditions as shown by the readings 3, 4, 4, and 3. It usually reads 1 or at most 2.

Acadian, Gatan, Cherokee, and Avoyelles were very susceptible to frogeye and the others were more or less resistant. Wood's Yellow was included in Group VIII, as well as Group VII, and again was outstanding in its susceptibility to downy mildew. Mamotan, Mamloxi, and Delsta, likewise, had a moderate number of lesions, but not enough to be of economic importance.

During these survey trips a number of other diseases of soybeans were noted, both in the nurseries and in other plots and fields. Among the most important of these diseases are: pod and stem blight (_Diaporthe phaseolorum_ var. _sojae_ (Lehm.) Wehmeyer), charcoal rot (_Macrophomina phaseoli_ (Maubl.) Ashby), sclerotial blight (_Sclerotium rolfsii_ Sacc.), anthracnose (_Glomerella glycines_ (Hori) Lehm. & Wolf), leaf spot (_Alternaria_ sp. or possibly arsenic injury), _Phyllosticta_ leaf spot (_Phyllosticta phaseolina_ Sacc.) bud blight (tobacco ring-spot virus), and an unknown virus disease.

In the 1944 survey an attempt was made to obtain some figures on the prevalence of pod and stem blight, charcoal rot, anthracnose, and sclerotial blight. These diseases were most prevalent at Stoneville, Mississippi, and Baton Rouge, Louisiana, especially during the latter part of the growing season. Under prevailing conditions at these locations, the soybeans made such a vigorous vegetative growth that the tops of adjacent rows often intermingled, shading the bases of the plants during most or all of the day. Furthermore, dews were heavy and rains were frequent so that the foliage often was wet nearly every night and for a considerable part of each forenoon. The stems and leaves about the bases of the plants, being heavily shaded, remained under conditions of high humidity and low light intensity for a large part of the time. Under these conditions the fungi that cause anthracnose, pod and stem blight, and charcoal rot developed rapidly. Many of the lower branches were killed back to the main stem. Some of the smaller plants, such as those dwarfed by crowding in thick stands, those that had a poor start because of delayed emergence, or those that were partly or wholly girdled by insects, often were killed by one or more of these diseases. Hasty study of this disease complex, such as was necessary under these survey conditions, indicated that data obtained under such conditions might be more confusing than useful. As nearly as could be determined in the time available, anthracnose was responsible for much of the killing, and the weakened or dead tissue was then invaded by secondary fungi. There is little doubt that, under suitable conditions, the pod and stem blight fungus can invade tissue not previously killed by some other fungus, but the extent to which this took place under the field conditions described could not be determined. From the observations made, this disease situation seemed to be so complicated that it was decided to abandon any attempt to estimate the prevalence of each disease and to leave this problem for intensive study by pathologists at these locations. So far as could be seen in the nurseries in 1944, there were no varieties resistant to the anthracnose, pod and stem blight, or charcoal rot. These diseases were of little or no importance in locations where the vegetative growth was less and the humidity lower.

Sclerotium rolfsii is commonly present in soybean fields in the South, but during the course of this survey no really serious epiphytotic produced by it was seen. The highest number of plants observed to be infected or killed by this fungus in a single 20-foot row was 30. The plants attacked were sometimes isolated but were commonly in small groups, sometimes occupying a foot or so of space in a row. Sometimes there were several centers of infection, but seldom were as many as 50 percent of the plants in a row involved. More commonly not more than one or a very few plants in a row were infected. Consequently the total loss of plants was not serious. In no nursery was the infection sufficiently uniform to make an estimate of the percentage of diseased plants in the different varieties of any value.

In 1945 the leaves of many varieties of soybeans in the nursery and an adjacent field at Stoneville, Mississippi, had large brown spots with concentric rings resembling lesions produced by Alternaria or possibly by arsenic (U.S.D.A. Farmer's Bull. 1937, figs. 10 and 11). The centers of many of the spots were frogeye lesions, typical fruiting structures of Cercospora sojina being present in abundance. The frogeye lesions appeared to have been invaded and enlarged by an Alternaria sp. or other fungus. An airplane dusting cotton sometimes circled over the field, and some arsenic drifted from the plane over the soybeans. Although the soybean plants were not defoliated, as when dusted heavily with an arsenical the possibility is suggested that enough arsenic to cause the damage reached the leaves and entered the tissue through lesions already present as a result of infection by the frogeye or other fungus or bacterium. There was some evidence that the pustule and wildfire lesions also served as points of entry for the causal agent of these larger spots. Similar lesions were not found elsewhere that year, but were found again at Stoneville in 1946, although in much smaller numbers, in plots that, so far as known, had received no arsenical dust. The precise nature of the agent that entered and enlarged these frogeye or other lesions under Stoneville conditions remains to be determined.

Phyllosticta leaf spot was present in several locations, but usually there were only a few lesions on a leaf and only a few leaves here and there were infected. Hence, the disease was of no economic importance.

Bud blight was seen in two locations in Georgia in 1944 and in one nursery in Arkansas in 1945. In all places the damage was slight and was limited to a few plants.

Traces of an undetermined virus disease were found at Richmond Hill, Georgia, in 1945 and at Experiment, Georgia, in 1946. The symptoms were seen in the leaves only and consisted of rather large irregular pale green areas often with narrow dark concentric lines. Attempts made by Dr. W. B. Allington at Urbana, Illinois, to transmit this disease from material sent from Experiment, Georgia, and by the writer at Experiment, failed.

SUMMARY

A disease survey of soybean nurseries located in Alabama, Georgia, Louisiana, Mississippi, and South Carolina was made each year from 1944 to 1946 inclusive. The chief purpose of this survey was to obtain information on the diseases present and their severity, and to determine whether any of the soybean varieties were resistant. Disease readings were made once or twice during the latter part of the growing season at each location. Readings were made on four replicated randomized 20-foot rows of each variety of soybean in Groups IV-S, VI, VII, and VIII in some nurseries and in two or three of the groups in others.

The readings on pustule-blight, wildfire, frogeye, and mosaic for 1946 and the averages of all readings for each year at all locations are given. Tables 1 to 12 give detailed data for 1946 and show the variations found in the different locations and in the different replications. The remaining tables (Tables 13-16) give the average figures for the three years.

The data presented indicate that the following varieties possess the greatest relative resistance to the bacterial pustule-blight complex: Ogden, C-N-S, Palmetto, Cherokee, and probably Louisiana Green and Dortchsoy #2, although only one season's data are available on the last two varieties. The resistance is only relative, since it breaks down more or less under certain conditions. Nevertheless, it is sufficiently stable to justify the use of such varieties, at least of Ogden and C-N-S, as breeding stock.

Resistance to wildfire, if there is any, will most probably be found in Ogden, C-N-S, Palmetto, Cherokee, and possibly Louisiana Green and Dortchsoy #2.

Some varieties were found to be outstandingly susceptible to frogeye, but the disease was seldom sufficiently severe to make possible a positive determination of the most resistant ones. The 1946 readings at Baton Rouge, where frogeye was rather severe on many varieties, indicated that the following probably are the most resistant varieties in Group VII: Roanoke, Volstate, F.C. 30261-1, and Wood's Yellow. On the other hand, the varieties Ogden, Rose Non-pop, and Burdette #20, in Group VI, and Acadian, Gatan, and Cherokee in Group VIII were highly susceptible to frogeye, and all the others were more or less resistant. In general, the hay types are more susceptible than the others.

There was so little downy mildew present on most varieties that no conclusions regarding their resistance can be drawn. Wood's Yellow, 26-39M, C-N-S, Delsta, Mamloxi, Nanda, and Mamotan were the most susceptible.

Mosaic was often present, but usually only in trace amounts. No final conclusions as to the most resistant varieties can be drawn from the data at hand, but the most seriously affected varieties observed in 1946 are: Rose-Non-pop, Burdette #13, Arksoy, Wood's Yellow, Palmetto, Roanoke, Volstate, Mamotan, Gatan, Seminole, C-N-S, Acadian, N44-774, N44-92, Red Tanner, Cherokee, Mamloxi, and Louisiana Green. If any variety were to be rated as resistant on the basis of the data obtained, it would be Ogden and possibly Dortchsoy #2.

Pod and stem blight, charcoal rot, sclerotial blight, anthracnose, leaf spot (Alternaria, or possibly arsenic), Phyllosticta leaf spot, bud blight, and an unknown virus disease were observed in the nurseries and in other plots and fields in the region.

Table 1. Bacterial pustule-blight ratings in soybean nurseries at several locations in 1946. Group VI

Location	Variety								
	Ogden	Rose Non-Pop	2-4CA	Arksoy 2913	Dortch-soy #2	Dortch-soy #7	Burdette #13	Burdette #19	Burdette #20
Tallassee, Ala. 7-22-46	0	0	1	1	0	0	1	0	0
	0	1	1	1	0	1	2	0	1
	1	1	1	1	0	3	1	1	1
	0	1	1	1	0	1	1	1	0
Fairhope, Ala. 8-16-46	1	3	3	4	1	4	3	5	4
	1	3	4	5	1	4	3	5	4
	1	3	4	5	1	4	4	5	3
	1	3	4	5	1	5	4	5	4
Stoneville, Miss. 8-14-46	1	3	3	3	2	3	3	2	3
	2	4	4	1	2	4	4	4	3
	1	4	4	4	1	4	4	4	3
	2	5	5	5	2	5	5	4	3
Stoneville, Miss. 8-14-46	1	3	3	3	1	2	2	3	2
	1	3	3	3	2	3	4	3	3
	1.3	3	4	3	1	3	4	3	3
	1	4	1	3	2	4	3	3	3
Watkinsville, Ga. 8-30-46	2	1	1	3	3	1	1	1	1
	2	2	1	2	2	2	2	1	1
	2	1	1	2	2	2	2	1	2
	2	1	2	3	2	2	3	2	2
Baton Rouge, La. 8-15-46	4	5	4	4	2	4	4	5	4
	3	4	5	4	2	4	4	5	3
	3	4	4	4	2	5	4	5	4
	2	4	4	4	3	5	4	5	3
Average	1.5	2.8	2.8	3.1	1.5	3.1	3.0	3.0	2.5

Table 2. Bacterial pustule-blight ratings in soybean nurseries at several locations in 1946. - Group VII

Location	Variety											
	Roanoke	Ogden	Vol-state	F.C. 3C261-1	Wood's Yellow	P.I.54613-4-1-2	N44-774	Pal-metto	C-N-S	N42-26	N44-92	Red Tanner
Tallassee	1	0	0	0	1	0	1	0	0	0	0	1
Ala.	1	0	1	0	0	0	1	0	0	1	1	2
7-22-46	1	0	1	0	0	0	1	0	0	1	1	1
	1	0	0	0	1	0	1	1	0	1	0	1
Experiment	1	1	2	1	2	1	1	1	1	2	1	2
Ga.	1	1	1	1	1	1	1	1	1	2	2	1
7-19-46	2	1	1	1	2	1	1	1	1	1	1	1
	2	1	1	2	1	3	1	1	1	2	2	1
Fairhope	3	2	3	4	3	--	3	2	1	3	3	3
Ala.	3	1	3	3	3	--	2	2	1	3	2	3
8-16-46	3	1	3	3	3	--	3	1	1	3	3	3
	1	3	3	3	2	--	2	1	1	3	3	3
Stoneville	4	1	4	--	3	3	3	1	1	2	2	2
Miss.	4	1	4	--	3	3	3	1	1	2	2	2
8-14-46	5	2	5	--	4	3	2	1	1	2	2	4
	5	2	5	--	4	4	3	1	1	2	2	2
Stoneville	3	1	3	--	3	3	2	2	1	2	2	2
Miss.	3	1	3	--	2	3	2	3	1	2	1	2
8-14-46	4	1	4	--	3	4	3	1	1	3	3	3
	3	1	3	--	3	3	2	1	1	2	2	2

Location	Variety											
	Roanoke	Ogden	Vol-state	F.C. 30261-1	Wood's Yellow	P.I. 54613-4-1-2	N44-774	Pal-metto	C-N-S	N42-26	N44-92	Red Tanner
Watkinsville	1	1	3	--	1	--	3	1	1	1	1	1
Ga.	1	1	2	--	1	--	1	1	1	1	1	1
8-30-46	2	2	2	--	1	--	--	1	1	2	1	1
	2	1	2	--	1	--	2	1	1	2	1	2
Tifton	4	2	4	--	4	--	3	2	2	3	4	3
Ga.	4	2	4	4	4	--	3	2	2	3	3	3
8-27-46	4	2	4	3	4	--	2	2	2	3	2	3
	4	2	4	4	4	--	3	2	2	3	3	3
Blackville	3	2	3	--	2	--	2	1	1	3	2	4
S. C.	4	1	3	--	2	--	4	1	2	3	3	3
8-29-46	4	3	2	--	3	--	3	1	1	4	3	2
	4	3	4	--	2	--	3	1	2	4	3	3
Blackville	3	3	1	--	1	--	3	0	1	2	1	3
S. C.	2	2	1	--	1	--	3	3	1	1	1	3
8-29-46	1	2	2	--	2	--	3	3	1	3	3	3
	2	2	2	--	2	--	3	3	1	2	2	3
Baton Rouge	4	3	4	4	4	--	3	1	3	3	2	3
La.	4	3	4	3	4	--	2	1	2	5	3	4
8-15-46	4	2	4	4	4	--	3	1	2	3	3	3
	4	2	4	--	5	4	3	1	1	3	3	3
Average	2.8	1.6	2.7	2.2	2.4	2.1	2.3	1.3	1.2	2.3	2.0	2.4

Table 3. Bacterial pustule-blight ratings in soybean nurseries at several locations in 1946. Group VIII

Location	Variety								
	Mam-loxi	Aca-dian	Mamo-tan	Nanda	Gatan	Semi-nole	Chero-kee	La. Green	Coker's Sel. #433
Tallassee	0	0	1	1	1	1	0	0	1
Ala.	1	1	1	2	1	1	1	1	1
7-22-46	2	1	1	1	2	1	0	0	1
	2	1	1	3	1	1	1	1	3
Experiment	3	3	2	3	3	2	1	1	2
Ga.	3	3	2	3	1	2	1	1	3
7-19-46	2	2	2	2	2	2	1	1	3
	3	1	2	1	2	2	1	1	1
Fairhope	2	3	3	3	3	2	2	1	3
Ala.	3	3	3	3	3	3	1	1	3
8-16-46	3	3	3	3	3	3	1	1	3
	3	3	3	3	3	3	2	1	3
Stoneville	2	1	2	2	2	2	1	1	2
Miss.	4	2	3	3	2	2	0	1	3
8-14-46	3	1	4	4	2	3	3	1	3
	3	3	3	3	3	3	2	1	3
Stoneville	2	3	2	2	2	2	1	1	2
Miss.	3	3	2	3	1	2	1	1	3
8-14-46	3	3	3	3	2	3	1	1	3
	3	3	3	3	3	3	2	1	2
Tifton	3	3	3	3	3	2	2	1	3
Ga.	3	3	4	3	3	2	2	1	3
8-27-46	3	3	4	3	3	4	2	1	3
	4	3	3	3	3	3	2	1	3
Baton Rouge	4	2	4	4	3	2	2	1	3
La.	3	2	3	4	3	3	3	1	4
8-15-46	3	2	4	3	3	2	2	1	3
	3	2	4	3	3	3	2	1	3
Average	2.7	2.3	2.7	2.8	2.4	2.3	1.4	0.9	2.6

Table 4. Wildfire ratings in soybean nurseries at several locations in 1946. Group VI

Location	Variety								
	Ogden	Rose Non-pop	2-40A	Ark-soy 2913	Dortch-soy #2	Dortch-soy #7	Burdette #13	Burdette #19	Burdette #20
Fairhope	0	0	0	0	0	0	0	0	0
Ala.	0	0	0	0	0	0	0	0	0
8-16-46	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
Stoneville	1	3	2	3	1	3	3	3	2
Miss.	1	3	2	0	0	3	3	3	3
8-14-46	0	4	4	2	1	3	4	3	2
	1	3	2	3	1	3	4	3	2
Stoneville	1	3	4	4	1	4	3	3	2
Miss.	1	4	4	4	2	4	4	4	4
8-14-46	1	4	4	4	1	4	3	4	2
	1	3	1	4	1	4	0	4	3
Watkinsville	1	2	2	1	1	2	3	2	1
Ga.	1	1	1	1	1	1	1	2	0
8-30-46	1	1	1	1	1	1	1	1	1
	1	3	1	1	2	3	2	2	1
Baton Rouge	0	1	1	1	1	1	1	1	1
La.	0	1	1	1	1	1	2	1	1
8-15-46	1	1	1	1	1	2	1	1	1
	1	1	1	1	1	1	1	1	1
Average	0.7	1.9	1.6	1.6	0.9	2.0	1.8	1.9	1.4

Table 5. Wildfire ratings in soybean nurseries at several locations in 1946. Group VII.

Location	Variety											
	Roanoke	Ogden	Volstate	F.C. 30261-1	Wood's Yellow	P.I. 54618-4-1-2	N44-774	Palmetto	C-N-S	N42-26	N44-92	Red Tanner
Fairhope	0	0	0	0	0	--	0	0	0	0	0	0
Ala.	0	0	0	0	0	--	0	0	0	0	0	0
8-16-46	0	0	0	0	0	--	0	0	0	0	0	0
	0	0	0	0	0	--	0	0	0	0	0	0
Stoneville	3	0	2	--	2	2	1	1	1	1	1	1
Miss.	3	0	2	--	2	2	1	1	1	1	1	1
8-14-46	2	0	1	--	2	1	0	1	1	1	1	1
	1	0	2	--	2	1	0	0	1	1	1	1
Stoneville	3	1	3	--	3	3	1	1	0	1	1	2
Miss.	4	1	4	--	3	4	2	1	1	2	1	2
8-14-46	3	0	3	--	3	3	2	0	0	2	1	2
	3	0	3	--	3	4	1	0	0	2	1	1
Watkinsville	2	1	1	--	1	--	0	1	0	1	0	1
Ga.	3	1	2	--	1	--	1	1	1	1	1	1
8-30-46	3	1	2	--	0	--	0	0	0	1	0	1
	1	1	1	--	0	--	1	0	0	1	1	0
Tifton	0	1	1	0	1	--	2	0	0	1	1	0
Ga.	3	0	2	0	2	--	1	0	0	2	2	2
8-26-46	2	0	2	1	2	--	0	1	1	2	1	2
	1	0	1	0	2	--	0	0	0	1	0	1
Baton Rouge	1	0	1	1	1	--	1	0	1	1	1	1
La.	1	1	1	1	1	--	1	1	1	1	1	1
8-15-46	1	0	1	1	2	--	0	1	1	1	1	1
	1	1	2	--	1	1	1	0	1	1	1	1
Average	1.7	0.4	1.5	0.4	1.4	2.3	0.7	0.4	0.5	1.0	0.8	1.0

Table 6. Wildfire ratings in soybean nurseries at several locations in 1946. Group VIII

Location	Variety Mam-loxi	Aca-dian	Mamo-tan	Nanda	Gatan	Semi-nole	Chero-kee	La. Green	Coker's Sel. #433
Fairhope	0	0	1	0	1	0	0	0	0
Ala.	0	0	0	0	0	0	0	0	0
8-16-46	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
Stoneville	1	2	2	1	1	1	1	1	2
Miss.	1.4	4	4	2	1	1	1	1	1
8-14-46	1	2	1	2	1	1	2	1	2
	1	1	1	2	1	1	0	0	1
Stoneville	1	3	2	2	1	2	0	0	3
Miss.	3	4	3	4	1	2	0	1	3
8-14-46	1	3	2	3	1	1	0	1	2
	2	2	2	3	1	1	0	1	2
Tifton	0	1	1	1	0	0	0	0	0
Ga.	1	1	0	2	0	1	0	0	1
8-27-46	2	1	2	1	1	1	1	1	3
	1	2	1	2	1	0	1	1	2
Tifton	3	2	2	3	1	2	1	1	2
Ga.	2	4	1	3	2	1	1	1	3
8-27-46	2	1	1	3	1	0	0	0	2
	1	1	0	1	0	0	0	0	1
Baton Rouge	1	1	1	1	1	1	1	1	1
La.	1	1	1	1	1	1	1	1	2
8-15-46	1	1	1	1	1	1	0	1	1
	1	1	1	1	1	1	0	1	1
Average	1.1	1.6	1.3	1.6	0.8	0.8	0.4	0.6	1.5

Table 7. Frogeye ratings in soybean nurseries at several locations in 1946. Group VI

Location	Variety								
	Ogden	Rose Non-pop	2-4CA	Arksoy 2913	Dortch-soy #2	Dortch-soy #7	Burdette #13	Burdette #19	Burdette #20
Fairhope, Ala. 8-16-46	1	1	0	0	0	0	0	0	0
	1	2	0	0	0	0	0	0	1
	1	1	0	0	0	0	0	0	1
	1	1	0	0	0	0	0	0	1
Stoneville, Miss. 8-14-46	1	1	0	0	1	0	1	0	2
	1	1	0	1	1	0	0	0	1
	1	1	0	1	1	0	2	0	2
	1	2	1	0	1	1	1	1	1
Stoneville, Miss. 8-14-46	1	1	0	0	0	0	0	0	1
	1.6	1	1	0	0	0	0	0	1
	1	2	0	0	1	0	1	0	1
	1	1	1	1	0	0	1	0	1
Baton Rouge, La. 8-15-46	3	3	1	0	1	1	1	1	4
	3	4	0	1	1	1	1	0	5
	2	2	1	1	1	1	0	0	4
	2	4	1	1	1	0	1	0	5
Average	1.4	1.8	0.4	0.4	0.6	0.3	0.6	0.1	1.9

Table 8. Frogeye ratings in soybean nurseries at several locations in 1946. Group VII.

Location	Variety											
	Roanoke	Ogden	Volstate	F.C. 30261-1	Wood's Yellow	P.I. 54618 -4-1-2	N44-774	Palmetto	C-N-S	N42-26	N44-92	Red Tanner
Stoneville	0	1	0	--	1	1	1	0	0	1	1	2
Miss.	0	1	0	--	1	1	1	0	0	1	1	2
8-14-46	0	0	0	--	0	1	1	0	0	2	1	2
	1	1	1	--	1	0	0	1	1	2	2	1
Fairhope	0	1	0	0	0	--	1	1	0	1	1	1
Ala.	0	1	0	0	0	--	1	0	1	1	1	1
8-16-46	0	1	1	1	0	--	0	0	0	1	1	1
	0	1	0	0	0	--	1	0	0	1	1	1
Stoneville	0	1	1	--	0	0	1	0	1	3	2	3
Miss.	0	1	0	--	1	0	1	1	0	1	1	0
8-14-46	0	1	0	--	0	0	0	0	0	2	2	2
	0	1	0	--	0	0	1	1	0	3	3	3
Blackville	0	0	0	--	0	--	0	0	0	0	0	0
S. C.	0	0	0	--	0	--	0	0	0	0	0	0
8-29-46	0	0	0	--	1	--	0	0	0	0	0	0
	1	0	0	--	0	--	0	0	1	0	0	1
Blackville	0	0	0	--	0	--	1	0	0	1	0	0
S. C.	0	0	0	--	0	--	1	0	0	0	0	0
8-29-46	0	0	0	--	1	--	0	0	0	0	0	0
	0	0	0	--	1	--	0	0	0	1	0	0
Baton Rouge	0	2	0	0	1	--	3	5	4	4	4	5
La.	1	2	0	0	0	--	2	5	3	3	3	5
8-15-46	0	2	0	0	1	--	2	5	2	5	4	5
	0	2	1	--	1	0	2	5	3	5	3	4
Average	0.1	0.8	0.2	0.1	0.4	0.3	0.8	1.0	0.7	1.6	1.3	1.6

Table 9. Frogeye ratings in soybean nurseries at several locations in 1946... Group VIII

Location	Variety								
	Mamloxi	Acadian	Mamotan	Nanda	Gatan	Seminole	Cherokee	Louisiana Green	Coker's Sel. #433
Fairhope, Ala.	0	1	0	0	1	1	1	0	0
8-16-46	0	0	0	0	0	0	1	0	0
	0	1	1	0	1	1	1	0	0
	0	1	1	0	1	0	1	0	0
Stoneville, Miss.	1	0	0	1	1	0	1	0	0
8-14-46	0	0	0	0	0	0	0	0	0
	0	1	0	1	1	1	1	0	0
	1	1	1	1	1	1	1	0	1
Stoneville, Miss.	1	1	0	0	1	1	1	0	0
8-14-46	0	1	0	0	1	0	1	0	0
	0	0	0	0	1	0	1	0	0
	1	1	0	0	1	1	1	0	0
Baton Rouge, La.	1	5	1	0	5	1	3	1	0
8-15-46	1	5	0	1	5	1	3	1	0
	1	5	1	1	5	1	4	1	0
	0	5	0	1	5	1	2	1	0
Average	0.4	1.8	0.3	0.4	1.9	0.6	1.4	0.3	0.1

Table 10. Mosaic ratings in soybean nurseries at several locations in 1946. Group VI

Location	Variety								
	Ogden	Rose Non-pop	2-40A	Arksoy 2913	Dortch-soy #2	Dortch-soy #7	Burdette #13	Burdette #19	Burdette #20
Tallassee, Ala.	1	3	1	2	1	2	2	1	1
7-22-46	1	3	1	2	1	2	3	2	2
	1	3	2	2	1	1	2	1	2
	1	3	1	2	1	2	2	2	2
Fairhope, Ala.	1	1	0	0	1	0	1	0	1
8-16-46	0	0	0	0	0	0	2	0	1
	0	1	0	0	0	0	1	0	1
	0	1	0	0	0	0	1	0	1
Stoneville, Miss.	1	1	1	0	1	1	1	1	1
8-14-46	1	1	0	0	1	0	0	0	0
	0	1	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
Stoneville, Miss.	1	1	0	1	1	1	2	1	1
8-14-46	1	1	1	1	0	1	2	0	0
	1	3	2	1	1	0	2	1	1
	1	0	1	1	0	0	1	0	0
Average	0.7	1.4	0.6	0.8	0.6	0.6	1.4	0.6	0.9

Table 11. Mosaic ratings in soybean nurseries at several locations in 1946. Group VII

Location	Variety											
	Roanoke	Ogden	Vol-state	F.C. 30261-1	Wood's Yellow	P.I. 54618-4-1-2	N44-774	Pal-metto	C-N-S	N42-26	N44-92	Red Tanner
Tallassee	2	1	1	--	2	--	2	2	3	1	1	2
Ala.	1	1	1	--	1	--	1	3	2	1	2	2
7-22-46	2	1	2	--	1	--	2	3	3	2	1	1
	2	1	1	--	2	--	2	2	2	2	2	1
Fairhope	1	0	0	1	1	--	2	1	1	1	1	2
Ala.	1	1	1	1	1	--	1	3	2	2	2	3
8-16-46	0	0	0	0	1	--	3	3	1	2	3	3
	0	0	1	0	0	--	3	2	2	1	2	3
Stoneville	1	0	1	--	1	1	1	3	1	1	0	3
Miss.	1	0	1	--	1	1	1	3	1	1	0	3
8-14-46	0	0	0	--	1	0	0	1	1	1	0	1
	0	0	0	--	0	0	0	1	1	0	0	1
Stoneville	2	1	1	--	2	2	2	4	1	1	2	2
Miss.	1	1	1	--	1	1	3	2	2	1	1	1
8-14-46	1	1	1	--	1	1	3	3	1	1	2	3
	0	0	1	--	0	0	1	1	0	0	1	1
Baton Rouge	0	0	0	--	0	--	0	1	0	0	0	0
La.	0	0	0	--	0	--	1	1	0	0	0	1
8-15-46	0	0	0	--	1	0	0	0	0	0	1	1
	0	0	0	--	0	0	0	0	0	0	0	1
Average	0.8	0.4	0.7	0.5	0.9	0.6	1.4	2.1	1.2	0.9	1.1	1.8

Table 12. Mosaic ratings in soybean nurseries at several locations in 1946. Group VIII

Location	Variety								
	Mamloxi	Acadian	Mamotan	Nanda	Gatan	Seminole	Cherokee	Louisiana Green	Coker's Sel. #433
Tallassee, Ala. 7-22-46	1	2	1	1	1	1	2	2	1
	2	3	2	1	1	1	3	2	1
	1	2	1	1	1	1	3	2	1
	1	1	1	2	1	1	2	2	0
Fairhope, Ala. 8-16-46	3	3	3	1	2	2	1	2	1
	3	3	2	1	2	2	1	2	1
	2	3	2	1	2	2	1	2	1
	1	3	1	1	2	2	2	3	1
Stoneville, Miss. 8-16-46	1	1	1	1	1	2	1	2	1
	0	0	0	1	1	1	0	2	1
	1	1	0	1	1	1	0	1	1
	0	1	1	0	1	1	1	2	0
Stoneville, Miss. 8-14-46	1	3	3	3	1	4	3	4	1
	1	1	1	1	1	2	2	3	1
	1	0	1	1	1	2	2	1	1
	0	2	1	1	2	2	1	1	0
Baton Rouge, La. 8-15-46	1	1	0	1	0	3	1	2	1
	1	1	0	1	2	3	0	2	1
	1	1	0	1	2	3	2	2	0
	1	2	0	1	1	3	1	3	1
Average	1.2	1.7	1.1	1.1	1.3	2.0	1.5	2.1	0.8

Table 13. Summary of the average disease ratings of the strains of the Uniform Soybean Test, Group IV-S, for 1944, 1945 and 1946

Strain	Pustule-blight			Wildfire			Downy mildew		
	1944	1945	1946	1944	1945	1946	1944	1945	1946
S100	2.3	2.4	4.0	1.0	2.5	3.6	0.5	0.8	0.5
C101	1.9	2.4	3.4	1.0	1.8	2.9	0.3	0.4	0.0
Patoka	2.0	2.0	3.5	0.8	0.8	2.3	0.8	2.2	0.3
S55-19	--	2.5	3.5	--	0.8	3.3	--	2.2	0.0
Gibson	2.4	2.8	3.7	1.0	3.0	3.9	0.3	1.0	0.0
Hongkong	--	2.0	3.0	--	0.0	2.0	--	1.0	0.0
Lincoln	--	--	3.9	--	--	1.5	--	--	0.0
Macoupin	1.9	2.6	--	1.0	1.3	--	0.8	0.0	--
Boone	2.1	2.6	--	1.0	1.5	--	0.8	2.4	--
Chief	1.4	2.2	--	1.0	2.0	--	0.0	0.0	--
S55-10	2.1	2.0	--	1.0	1.8	--	1.0	2.8	--
S55-35	2.2	2.0	--	0.8	0.8	--	1.8	2.0	--

Table 14. Summary of average disease ratings of the strains of the Uniform Soybean Test, Group VI, for 1944, 1945, and 1946

Strain	Pustule-blight			Wildfire			Frogeye			Downy mildew		
	1944	1945	1946	1944	1945	1946	1944	1945	1946	1944	1945	1946
Dortchsoy #2	--	--	1.5	--	--	0.9	--	--	0.6	--	--	0.3
Ogden	1.2	2.0	1.5	0.8	0.3	0.7	0.8	0.8	1.4	--	0.6	0.4
Burdette #20	--	--	2.5	--	--	1.4	--	--	1.9	--	--	0.2
2-40A	1.7	3.2	2.8	1.0	0.5	1.6	0.5	0.3	0.4	--	0.0	0.1
Burdette #19	--	--	3.0	--	--	1.9	--	--	0.1	--	--	0.2
Dortchsoy #7	--	--	3.1	--	--	2.0	--	--	0.3	--	--	0.1
Rose Non-Pop	--	3.0	2.8	--	1.1	2.0	--	1.0	1.6	--	0.0	0.2
Burdette #13	--	--	3.0	--	--	1.8	--	--	0.6	--	--	0.3
Arksoy #2913	1.7	3.2	3.1	0.9	0.7	1.9	0.0	0.3	0.4	--	0.2	0.0
Ralsoy	1.8	3.3	--	0.9	0.7	--	0.3	0.3	--	--	0.8	--
Mamredo	2.1	3.3	--	1.0	0.7	--	0.8	0.7	--	--	0.2	--
Magnolia	1.7	3.0	--	1.0	0.5	--	0.0	0.9	--	--	0.3	--
Armredo	1.5	3.0	--	0.9	0.4	--	1.3	1.1	--	--	0.2	--
6-40M	1.9	3.4	--	1.0	0.4	--	0.3	0.4	--	--	0.1	--
P.I. 97066	1.5	2.7	--	0.8	0.5	--	1.5	1.2	--	--	0.0	--
Delsoy	--	3.0	--	--	0.9	--	--	1.2	--	--	0.0	--
N41-39	1.8	--	--	0.9	0.9	--	1.0	--	--	--	--	--
26-39M	1.3	--	--	1.0	--	--	--	--	--	--	--	--

Table 15. Summary of average disease ratings of the strains of the Uniform Soybean Test, Group VII, for 1944, 1945, and 1946

Strain	Pustule-blight			Wildfire			Frogeye			Downy mildew		
	1944	1945	1946	1944	1945	1946	1944	1945	1946	1944	1945	1946
N44-92	--	--	2.0	--	--	0.8	--	--	1.3	--	--	0.4
Ogden	1.8	1.9	1.6	0.8	0.4	0.4	0.8	0.5	0.8	--	0.8	0.3
N44-774	--	--	2.3	--	--	0.7	--	--	0.8	--	--	0.2
Roanoke	2.2	2.8	2.3	1.8	0.8	1.7	0.6	0.0	0.1	--	1.1	0.3
N42-26	--	--	2.3	--	--	1.0	--	--	1.6	--	--	0.2
Wood's Yellow	1.9	2.4	2.4	1.8	0.8	1.4	0.5	0.3	0.4	--	1.9	1.4
Volstate	2.1	2.7	2.7	1.3	0.8	1.5	0.3	0.0	0.3	--	1.1	0.5
C-N-S	1.1	1.8	1.2	2.0	0.6	0.5	0.3	0.0	0.7	--	1.9	0.7
Palmetto	1.6	2.2	1.3	1.1	0.6	0.4	0.6	0.2	1.0	--	0.6	0.2
Red Tanner	--	--	2.4	--	--	1.0	--	--	1.6	--	--	0.1
F. C. 30261-1	--	--	2.2	--	--	0.4	--	--	0.1	--	--	0.0
P.I. 54618-4-1-2	--	--	2.1	--	--	2.3	--	--	0.3	--	--	0.1
Tenn. Non-Pop	2.3	--	--	1.5	--	--	1.3	--	--	--	--	--
Rose Non-Pop	2.4	--	--	0.6	--	--	1.0	--	--	--	--	--
Monetta	2.3	2.9	--	1.8	1.1	--	0.6	0.2	--	--	0.6	--
P.I. 85355	2.0	--	--	1.6	--	--	0.5	--	--	--	--	--
Missoy	1.9	2.5	--	1.5	1.0	--	1.4	1.0	--	--	0.4	--
P.I. 89775-A	2.3	3.0	--	1.5	1.0	--	1.7	1.5	--	--	0.6	--
Mamloxi	2.3	--	--	1.4	--	--	0.7	--	--	--	--	--
Auburn #1	2.3	--	--	1.3	--	--	0.3	--	--	--	--	--
Tokyo	1.9	--	--	1.3	--	--	0.6	--	--	--	--	--
26-39M	--	2.5	--	--	0.8	--	--	0.2	--	--	1.9	--

Table 16. Summary of average disease ratings of the strains of the Uniform Soybean Test, Group VIII, for 1944, 1945, and 1946

	Pustule-blight			Wildfire			Frogeye			Downy mildew		
Strain	1944	1945	1946	1944	1945	1946	1944	1945	1946	1944	1945	1946
Mamotan	2.1	2.4	2.7	1.4	0.7	1.3	0.5	0.2	0.3	--	1.1	0.5
Nanda	2.4	2.9	2.8	1.6	0.9	1.6	0.5	0.1	0.4	--	0.9	0.6
Mamloxi	--	2.6	2.7	--	0.8	--	--	0.2	0.4	--	1.3	1.2
Acadian	2.2	2.8	2.3	0.8	0.9	1.6	0.8	0.3	1.8	--	0.1	0.1
Louisiana Green	--	--	0.9	--	--	0.6	--	--	0.3	--	--	0.4
Coker Sel. #433	--	--	2.6	--	--	1.5	--	--	0.1	--	--	0.2
Gatan	1.8	2.6	2.4	1.4	0.6	0.7	1.3	0.6	1.9	--	0.1	0.1
Cherokee	1.6	1.9	1.4	0.8	0.2	0.4	1.0	0.6	1.4	--	0.4	0.1
Seminole	2.1	2.6	2.3	1.1	0.6	0.8	0.9	0.3	0.6	--	0.6	0.1
Wood's Yellow	2.0	2.6	--	1.4	0.9	--	0.6	0.2	--	--	1.4	--
Delsta	2.2	2.7	--	1.4	0.7	--	0.5	0.2	--	--	1.0	--
Pelican	2.5	2.8	--	1.2	1.2	--	0.6	0.2	--	--	0.3	--
Avoyelles	1.8	2.2	--	0.8	0.6	--	1.9	0.9	--	--	0.1	--
L.Z.	2.3	2.8	--	1.1	1.0	--	0.6	0.4	--	--	0.4	--
Red Tanner	--	3.0	--	--	0.7	--	--	1.0	--	--	0.0	--

THE PLANT DISEASE REPORTER

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SUPPLEMENT 169

A HOST INDEX OF MISSISSIPPI PLANT DISEASES

Supplement 169 June 15, 1947

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

PLANT DISEASE REPORTER SUPPLEMENT

Issued by

THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station Beltsville, Maryland

A HOST INDEX OF MISSISSIPPI PLANT DISEASES

J. T. Presley

Plant Disease Reporter
Supplement 169 June 15, 1947

INTRODUCTION

This compilation contains in the form of a host index all available information on the occurrence and distribution of the plant diseases so far recorded in Mississippi. By far the greater portion of the material here presented was taken from the collections made by Dr. L. E. Miles during his several years at Mississippi State College. It is hoped that bringing the material together in this form will make available to pathologists the greater portion of the valuable collection made by Dr. Miles. Additions to the collection have been made by former members of the Plant Pathology Staff at Mississippi State College, State Plant Board Inspectors, and the present Plant Pathology Staff. This is the first contribution toward a host index of plant diseases in Mississippi.

Arrangment of Indexes

The three sections of the publication are each arranged alphabetically.

1. A host index listing the host, together with all of the pathogens known to occur on it in Mississippi.

2. An index of pathogens, each with a list of the hosts upon which it has been reported in Mississippi.

3. An index of the common names of host plants taken from Standardized Plant Names, First Edition, 1923; Second Edition 1942; Illustrated Flora by Britton and Brown, 1913, Charles Scribner's Sons, New York; Plant Life of Alabama by Mohr, 1901, The Brown Printing Co., Montgomery, Alabama.

HOST INDEX

ABELIA
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Heterodera marioni (Cornu) Goodey, Root-knot. Newton and Stone.

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Puccinia graminis Pers., Rust. Oktibbeha.

A. PERENNANS (Walt.) Tuckerm., Grass.
Acrospermum compressum Tode ex Fr., Leaf Spot. Simpson.

A. SP.
Uromyces eragrostidis Tracy, Rust. Lowndes and Simpson.

AILANTHUS

A. ALTISSIMA (Mill.) Swingle, Tree of Heaven.
Cytospora ailanthi Berk. & Curt. Jasper.

ALETRIS

A. AUREA Walt., Stargrass
Puccinia aletridis Berk. & Curt., Rust. Jackson.

ALEURITES

A. FORDII Hemsl., Tung-oil Tree.
Corticium stevensii Burt., Leaf Blight (Thread Blight).
Heterodera marioni (Cornu) Goodey, Root-knot. Pearl River.
Rhizoctonia microsclerotia Matz., Leaf Blight. Pearl River.

ALLIUM

A. CANADENSE L., Meadow Garlic.
Heterosporium allii Ell. & Mart., Leaf Spot. Oktibbeha.

A. CEPA L., Garden Onion.
Botrytis vulgaris (Pers.) Fr., Gray Mold. Pearl River.
Macrosporium parasiticum Thum. var. *porri* Ell. Harrison.
Macrosporium sarcinula B. var. *parasiticum* Thuem., Black Stalk Rot. Oktibbeha.
Peronospora schleideni Unger., Downy Mildew. Lamar.

A. SP., Onion.
Macrosporium commune Rab. Hinds.

ALNUS
A. INCANA (L.) Moench, Speckled Alder.
Taphrina alni-incanae (Kuehn) Magn., Catkin Disease. Harrison.

A. RUGOSA (DuRoi) Spreng., Hazel Alder.
Diatrypella discoidea Cke. & Pk. var. *alni* Cke. Oktibbeha and Tallahatchie.
Melanconis marginalis (Pk.) Wehmeyer, Twig Blight. Humphreys.
Peniophora aurantiaca Bres. Oktibbeha.
Poria vaporaria (Pers.) Fr. Oktibbeha.

A. SP.
Eutypella cerviculata (Fr.) Sacc. Webster.
Hypoxylon fuscum (P.) Fr. Jefferson.
Stereum ochraceoflavum Schw. Lee.

ALOPECURUS
A. AEQUALIS Sobol., Shortawn Foxtail
Fusicladium alopecuri Ell. & Ev. Oktibbeha.

A. GENICULATUS L., Water Foxtail
Scolecotrichum graminis Fckl., Leaf Blotch. Oktibbeha and Sunflower.

ALTHAEA
A. ROSEA (L.) Cav., Hollyhock
Cercospora althaeina Sacc., Leaf Spot. Hinds, Lauderdale, Monroe, and Yazoo.
Puccinia heterospora Berk. & Curt., Rust. Forrest.
Puccinia malvacearum Bert., Rust. Covington, Forrest, Hancock, and Jones.

A. SP.
Heterodera marioni (Cornu) Goodey, Root-knot. Pearl River.

AMARANTHUS
A. RETROFLEXUS L., Green Amaranth, Redroot.
Albugo bliti (Biv.) O. Kunze, White Rust. Jackson and Oktibbeha.

AMBROSIA
A. ARTEMISIIFOLIA L., Common Ragweed
Albugo tragopogonis (Pers.) S. F. Gray, White Rust. Bolivar and Pearl River.
Erysiphe cichoracearum DC., Powdery Mildew. Amite and Oktibbeha.
Phyllachora ambrosiae (Schw.) Sacc., Leaf Spot. Marion and Oktibbeha.

A. TRIFIDA L., Giant Ragweed.
Albugo tragopogonis (Pers.) S. F. Gray, White Rust. Oktibbeha.
Erysiphe cichoracearum DC., Powdery Mildew. Clay.
Sclerotium rolfsii Sacc., Southern Blight. Oktibbeha.
Septoria bacilligera Wint., Leaf Spot. Adams.

AMELANCHIER

A. CANADENSIS (L.) Medic., Juneberry
Gymnosporangium nidus-avis Thaxt., Rust. Marshall.

AMORPHA

A. FRUTICOSA L., Indigobush Amorpha
Camarosporium amorphae Sacc. Sunflower.
Diplodia amorphae (Wallr.) Sacc. Issaquena and Stone.
Uropyxis amorphae (Curt.) Schroet., Rust. Forrest and Monroe.

AMPHICARPA

A. BRACTEATA, Southern Hogpeanut
Synchytrium decipiens Farl. Leake and Prentiss.

A. PITCHERI Torr. & Gr., Pitchers Hogpeanut.
Synchytrium decipiens Farl. Lafayette.

ANDROPOGON

A. FURCATUS Muhl., Big Bluestem.
Cerebella andropogonis Ces., False Smut. Washington.
Puccinia andropogonis Schw., Rust. Oktibbeha.
Puccinia ellisiana Thuem., Rust. Hinds.

A. GLOMERATUS (Walt.) B.S.P., Bushy Bluestem.
Sorosporium consanguineum Ell. & Ev., Smut. Hancock.

A. MURICATUS Retz., Grass.
Didymella andropogonis Ell. & Ev., Leaf Spot. Monroe.

A. SCOPARIUS Michx., Little Bluestem.
Puccinia andropogonis Schw., Rust. Clarke and Oktibbeha.
Puccinia ellisiana Thuem., Rust. Oktibbeha.
Sorosporium ellisii Wint., Smut. Oktibbeha and Webster.
Sorosporium everhartii Ell. & Gall., Smut. Forrest.
Sphacelotheca ischaemi (Fckl.) Clint., Smut. Yalobusha.

A. VIRGINICUS L., Broomsedge.
Metasphaeria infuscans Ell. & Ev. Tate.
Uromyces andropogonis Tracy, Rust. Clarke.

A. SP.
Stictis arundinaceae Pers. Yazoo.

ANEMONE

A. CAROLINIANA Walt., Carolina Anemone.
Septoria anemones Desm., Leaf Spot. Oktibbeha.

A. VIRGINIANA L., Tall Anemone.
Phleospora anemones Ell. & Kell. Lafayette.
Puccinia anemones-virginianae Schw., Rust. Lafayette.
Septoria anemones Desm., Leaf Spot. Attala and Oktibbeha.

ANTHOXANTHUM
A. ARISTATUM Boiss., Annual Vernalgrass.
Puccinia graminis Pers., Rust. Oktibbeha.

ANTIRRHINUM
A. MAJUS L., Common Snapdragon.
Colletotrichum antirrhini Stewart, Anthracnose. Lauderdale.
Puccinia antirrhini Diet. & Holw., Rust. Wilkinson.

A. SP., Snapdragon.
Heterodera marioni (Cornu) Goodey, Root-knot. Copiah, Lauderdale, Lee, Monroe, and Washington.
Puccinia antirrhini Diet. & Holw., Rust. Copiah, Marion, and Wilkinson.

APIUM
A. GRAVEOLENS L., Celery
Cercospora apii Fr., Leaf Spot. Calhoun, Clay, and Winston.

APOCYNUM
A. CANNABINUM L., Hemp Dogbane.
Phyllosticta apocyni Trel., Leaf Spot. Choctaw.
Septoria littorea Sacc., Leaf Spot. Pontotoc.

ARABIS
A. VIRGINICA (L.) Trel., Rockcress.
Albugo candida (Pers. ex Lév.) O. Kunze, White Rust. Oktibbeha.

ARACHIS
A. HYPOGAEA L., Peanut.
Cercospora personata (Berk. & Curt.) Ell., Leaf Spot. Attala, Holmes, Jackson, Kemper, Oktibbeha, and Washington.
Sclerotium rolfsii Sacc., Southern Blight. Bolivar and Oktibbeha.

ARCTIUM
A. MINUS Schk., Common Burdock.
Puccinia bardanae (Wallr.) Cda., Rust. Clarke.

ARISAEMA
A. DRACONTIUM (L.) Schott, Dragonroot Jack-in-the-Pulpit.
Uromyces caladii (Schw.) Farl., Rust. Hinds and Wayne.

ARISTIDA
A. PURPURASCENS Poir., Arrowfeather Threeawn.
Hendersonula aristidae (S.) Ell. Lowndes.

ARRHENATHERUM
A. ELATIUS (L.) Beauv., Tall Oatgrass.
Ustilago perennans Rost., Smut. Attala and Rankin.
Ustilago segetum (Bull.) Dit., Loose Smut. Grenada and Lamar.

ARUNDINARIA

A. TECTA (Walt.) Muhl., Small Cane.
Apiosporium montagnei (Dur. & Mont.) Sacc. Lee and Scott.
Belonium eustegiforme (Berk. & Curt.) Sacc. Sunflower.
Coniosporium arundinellae Ell. & Tracy. Benton and Pontotoc.
Diatrype consobrina Mont. Greene.
Meliola tenuis Berk. & Curt., Sooty Mold. Tunica.
Puccinia arundinariae Schw., Rust. Hinds.
Stictis helicotricha Ell. & Ev. Tunica.

A. SP., Cane.
Epiccocum simplex Berk. & Curt. Jones.

A. SP.
Diatrype consobrina Mont. Pontotoc.
Hypoxylon perforatum (Schw.) Fr. Pike.

ASCLEPIAS

A. INCARNATA L., Swamp Milkweed.
Cercospora clavata (Gerard) Pk., Leaf Spot. Washington.

A. SYRIACA L., Common Milkweed.
Cercospora clavata (Gerard) Pk., Leaf Spot. Monroe.
Uromyces asclepiadis (Schw.) Cke., Rust. Lafayette.
Uromyces howei Pk., Rust. Lafayette.

ASCYRUM

A. HYPERICOIDES L., St. Andrew's Cross.
Uromyces hyperici (Spreng.) Curt., Rust. Harrison.

A. STANS Michx., Atlantic St. Peter's Wort.
Cladosporium gloeosporioides Atk. Pearl River.

ASIMINA

A. TRILOBA (L.) Dunal., Common Pawpaw.
Phyllosticta asiminae Ell. & Kell., Leaf Spot. Oktibbeha.

ASPARAGUS

A. OFFICINALIS L., Garden Asparagus.
Puccinia asparagi DC., Rust. Forrest and Tallahatchie.

A. SPRENGERI Regel., Sprenger Asparagus.
Cladosporium fasciculare (Pers.) Fr., Leaf Mold. Rankin.

A. VERTICILLATUS L., Asparagus.
Puccinia asparagi DC., Rust. Jefferson.

ASTER

A. CORDIFOLIUS L., Common Blue Wood Aster.
Puccinia asteris Duby, Rust. Jackson.
Puccinia asterum Kern, Rust. Jackson and Oktibbeha.
Puccinia extensicola Plowr., Rust. Oktibbeha.

ASTER cont.
A. SAGITTIFOLIUS Willd., Arrowleaved Aster.
Coleosporium solidaginis (Schw.) Thuem., Rust. Oktibbeha.

A. SP.
Rosenscheldia heliopsidis (Schw.) Theiss. & Syd. Yalobusha.

AUCUBA
A. JAPONICA, Japanese Aucuba.
Phyllosticta aucubae Sacc. & Speg., Leaf Spot. Holmes.

AVENA
A. SATIVA L., Common Oat.
Colletotrichum graminicolum (Ces.) G. W. Wils., Anthracnose. Claiborne.
Dicaeoma rhamni Ktze., Rust. Harrison.
Helminthosporium sp., Leaf Spot.
Pseudomonas avenae Manns. Oktibbeha.
Puccinia coronata Cda., Crown Rust. Attala, Grenada, Harrison, Jackson, and Yazoo.
Puccinia graminis avenae Eriks. & Henn., Stem Rust. Claiborne.
Sclerospora macrospora Sacc., Downy Mildew. Sunflower.
Ustilago avenae (Pers.) Jens., Loose Smut. George, Hinds, Holmes, Humphreys, Issaquena, Madison, Oktibbeha, Panola, Rankin, Sharkey, Simpson, Warren, and Washington.
Ustilago levis (Kell. & Swing.) Mag., Loose Smut. Jasper, Newton, and Panola.
Ustilago segetum (Bull.) Dit., Loose Smut. Jefferson Davis.

AXONOPUS
A. COMPRESSUS (Swartz) Beauv., Carpet Grass.
Physarum cinereum (Batsch) Pers., Slime Mold.

A. SP., Carpet Grass.
Cerebella andropogonis Ces., False Smut. Wilkinson.

BEGONIA
B. SP., Begonia.
Agrobacterium tumefaciens (E. F. Sm. & Town.) Conn., Crown Gall. Warren.

BERCHEMIA
B. SCANDENS (Hill) Trelease, Rattan-vine
Puccinia coronata Cda., Crown Rust. Oktibbeha.

BETA
B. VULGARIS L., Beet.
Cercospora beticola Sacc., Leaf Spot. Lee, Lincoln, Monroe, and Oktibbeha.
Heterodera marioni (Cornu) Goodey, Root-knot. DeSoto, Monroe, and Panola.

BETULA

B. LENTA L., Sweet Birch.
Asterosporium betulinum Pk. Rankin.
Creonectria purpurea (L.) Seaver. Harrison.
Diatrypella betulina Pk. Sharkey.
Melanconis stilbostoma (Fr.) Tul., Twig Blight. Pontotoc.

B. SP., Birch.
Melanconium bicolor Nees ex Fr., Canker. Tunica.

BIDENS

B. FRONDOSA L., Beggarticks.
Cercospora umbrata Ell. & Holw., Leaf Spot. Lafayette.
Sphaerotheca humuli (DC.) Burr., Powdery Mildew. Neshoba.

BIGNONIA

B. CAPREOLATA L., Crossvine.
Cercospora capreolata Ell. & Ev., Leaf Spot. Oktibbeha.
Meliola bidentata Cke., Sooty Mold. Pearl River.

BOUTELOUA

B. CURTIPENDULA (Michx.) Torr., Sideoats Grama.
Puccinia vexans Farl., Rust. Webster.

BRASSICA

B. NIGRA (L.) Koch, Black Mustard.
Albugo candida (Pers. ex Lév.) O. Kunze, White Rust. Hinds, Jefferson, and Leflore.
Macrosporium herculeum Ell. & Martin, Leaf Spot. Stone.

B. OLERACEA var. CAPITATA L., Cabbage.
Alternaria brassicae (Berk.) Sacc., Leaf Spot.
Cercospora bloxami Berk. & Br., Leaf Spot. George.
Heterodera marioni (Cornu) Goodey, Root-knot. Choctaw, Copiah, Hancock, Harrison, Jackson, Lauderdale, Lincoln, Monroe, Noxubee, Oktibbeha, Rankin, Tate, Walthall, Webster, and Winston.
Peronospora parasitica (Pers.) DBy., Downy Mildew. Adams, Lauderdale, and Walthall.
Phoma lingam (Tode) Desm., Black Leg. Bolivar and Oktibbeha.

B. RAPA L., Turnip.
Alternaria herculea (Ell. & Mart.) J. A. Elliott, Leaf Spot. Clarke.
Cercosporella albo-maculans (Ell. & Ev.) Sacc., Leaf Spot. George, Jones, and Pearl River.
Colletotrichum higginsianum Sacc., Leaf Spot. Calhoun, Harrison, Jones, Lauderdale, Oktibbeha, and Stone.
Cylindrosporium brassicae Fautr. & Roum., Leaf Spot. Attala.
Heterodera marioni (Cornu) Goodey, Root-knot. Attala, Choctaw, Holmes, Jones, and Monroe.
Peronospora parasitica (Pers.) DBy., Downy Mildew. Lowndes.

BROMUS
B. SECALINUS L., Chess Brome.
Colletotrichum graminicolum (Ces.) G. W. Wils., Anthracnose. Coahoma.
Phoma graminella Sacc. Yalobusha.

BUMELIA
B. LYCIOIDES (L.) Pers., Southern Buckthorn.
Phyllosticta bumeliae Underw. & Earle, Leaf Spot. Oktibbeha.
Septoria bumeliae Sacc., Leaf Spot. George, Harrison, and Jackson.

BURSA
B. BURSA-PASTORIS (L.) Britton, Shepherds-Purse.
Albugo candida (Pers. ex Lév.) O. Kunze, White Rust. Oktibbeha.

BUXUS
B. SEMPERVIRENS L., Common Box
Laestadia buxi (Desm.) Sacc. Alcorn and Marshall.
Macrophoma candollei (Berk. & Br.) Berl. & Vogl., Leaf Blight. Alcorn, Coahoma, Hinds, Oktibbeha, and Pike.
Verticillium buxi (Lk.) Auersw. & Fleisch., Wilt. Alcorn.

B. SP., Box.
Heterodera marioni (Cornu) Goodey, Root-knot. Greene and Harrison.
Macrophoma candollei (Berk. & Br.) Berl. & Vogl., Leaf Blight. Yazoo and Jones.
Nectria rousselliana Tul., Canker. Leflore.

CACALIA
C. ATRIPLICIFOLIA L., Pale Indian Plantain
Septoria cacaliae Ell. & Kell., Leaf Spot. Choctaw.

C. TUBEROSA Nutt., Indian Plantain.
Septoria cacaliae Ell. & Kell., Leaf Spot. Clarke.

CACTUS
C. SP.
Gloeosporium cactorum Ston., Anthracnose. Forrest and Holmes.
Heterodera marioni (Cornu) Goodey, Root-knot. Holmes.

CALADIUM
C. SP.
Heterodera marioni (Cornu) Goodey, Root-knot. Hinds.

CALAMOVILFA
C. LONGIFOLIA (Hook.) Scribn., Prairie Sandreed.
Puccinia amphigena Diet., Rust. Oktibbeha.

CALLICARPA

C. AMERICANA L., American Beautyberry.

Cercospora callicarpae Cke., Leaf Spot. Copiah.

Diatrype callicarpae Berk. & Rav. Holmes.

CALLISTEPHUS

C. CHINENSIS (L.) Nees, Common China-Aster.

Fusarium oxysporum f. *conglutinans* (Wr.) Snyder & Hansen, Yellows. Yazoo.

CAMELLIA

C. JAPONICA L., Common Camellia.

Colletotrichum camelliae Mass. Hancock, Harrison, Pearl River, and Pike.

Colletotrichum sp., Anthracnose. Hancock and Jones.

Glomerella cingulata (Stonem.) Spauld. & Schrenk., Anthracnose. Jones.

Monochaetia camelliae Miles, Leaf Spot. Lowndes and Pike.

Pestalozzia guepini Desm., Leaf Spot. Adams and Tishomingo.

Phyllosticta sp., Leaf Spot. Harrison.

C. SP.

Gloeosporium sp., Leaf Spot. Jones.

CAMPANULA

C. AMERICANA L., Tall Bellflower.

Coleosporium campanulae (Pers.) Lév., Rust. Calhoun.

Septoria campanulae (Lév.) Sacc., Leaf Spot. Chickasaw.

CAMPSIS

C. RADICANS Seem., Common Trumpetcreeper.

Cercospora sordida Sacc., Leaf Spot. Lowndes, Oktibbeha, and Washington.

CAPSICUM

C. ANNUUM L., Pepper

Bacterium vesicatorium Doidge, Leaf Spot.

Cercospora capsici Heald & Wolf, Leaf Spot.

Fusarium annuum Leon., Wilt.

Sclerotium rolfsii Sacc., Southern Blight. Stone.

C. SP., Pepper.

Cercospora capsici Heald & Wolf, Leaf Spot. Pearl River and Stone.

Gloeosporium piperatum Ell. & Ev., Pod Rot, Anthracnose. Stone.

Glomerella piperata (Stonem.) Spauld. & Schrenk. Pearl River.

Heterodera marioni (Cornu) Goodey, Root-knot. Harrison, Holmes, Humphreys, Jasper, Lauderdale, Leake, Leflore, Stone, Sunflower, Walthall, and Washington.

Sclerotium rolfsii Sacc., Southern Blight. Stone.

CAREX

C. CHEROKEENSIS Schwein., Cherokee Sedge.
Volutella caricicola Miles. Oktibbeha.

C. COMPLANATA Torr., Hirsute Sedge.
Uromyces minutus Diet., Rust. Holmes.

C. FRANKII Kunth., Frank's Sedge.
Puccinia bolleyana Sacc., Rust. Oktibbeha.

C. MUHLENBERGII Schk., Muhlenberg's Sedge.
Puccinia asterum Kern., Rust. Choctaw.
Puccinia extensicola Plowr., Rust. Choctaw.

C. SP., Sedge.
Puccinia ludibunda Ell. & Ev., Rust. Yalobusha.

C. SP.
Puccinia asterum Kern., Rust. Harrison.
Puccinia extensicola Plowr., Rust. Harrison and Yalobusha.
Puccinia extensicola asteris (Thuem.) Arth., Rust. Harrison.
Puccinia minuta Diet., Rust. Lafayette.
Septoria riparia Pass., Leaf Spot. Oktibbeha.

CARPINUS

C. CAROLINIANA Walt., American Hornbeam.
Peniophora cinerea (P. ex Fr.) Cke. Yazoo.

C. SP.
Hypoxylon subchlorinum Ell. & Calk. Rankin.

CARYA

C. ALBA(L.) K. Koch, Mockernut Hickory.
Microstroma juglandis (Ber.) Sacc., Leaf Spot. Oktibbeha.

C. CORDIFORMIS (Wang.) K. Koch, Bitternut Hickory.
Clasterosporium uncinatum Clint. Bolivar.

C. ILLINOENSIS (Wang.) K. Koch, Pecan.
Cercospora fusca Rand, Leaf Spot. Clarke, Coahoma, Jackson, and Leflore.
Cladosporium effusum (Wint.) Dem., Scab.
Fusicladium effusum Wint., Scab. Clarke, Humphreys, Jackson, Lamar, and Stone.
Gnomonia nerviseda Cole, Vein Spot. Oktibbeha.
Gnomonia setacea (P.) Ces. & DeN., Leaf Spot. Tishomingo.
Myriangium tuberculans Miles. Clarke, Hinds, Jackson, Lamar, and Marion.
Phyllosticta caryae Pk., Leaf Spot. Jones.
Polyporus hemileucus B. & C. Grenada.
Septobasidium retiforme (Berk. & Curt.) Pat., Canker. Stone.

CARYA--continued

C. SP.
Cercospora fusca Rand, Leaf Spot. Lafayette.
Diatrypella hysterioides Ell. & Ev. Webster.
Thelephora retiformis Berk. & Curt. Yazoo.
Tryblidium insculptum Cke. Humphreys.
Valsa deusta Ell. & Ev. Lauderdale.

CASSIA

C. MARILANDICA L., American Senna.
Cercospora chamaecristae Ell. & Kell., Leaf Spot. Pearl River and Union.
Cercospora simulata Ell. & Ev., Leaf Spot. Pearl River.

C. OCCIDENTALIS L., Coffee Senna.
Cercospora occidentalis Cke., Leaf Spot. Coahoma.
Cercospora sphaeroidea Speg., Leaf Spot. Coahoma.

C. TORA L., Low Senna.
Cercospora nigricans Cke., Leaf Spot. Tippah.

CASTANEA

C. DENTATA(Marsh.) Borkh., American Chestnut.
Endothia parasitica (Murr.) P. J. & H. W. Anderson, Blight. Tishomingo.
Leptothyrium castanicolum Ell. & Ev. Harrison.

C. SP.
Endothia parasitica (Murr.) P. J. & H. W. Anderson, Blight. Harrison.

CATALPA

C. BIGNONIOIDES Walt., Southern Catalpa.
Macrosporium catalpae Ell. & Mart. Leflore and Noxubee.

C. SPECIOSA Warder, Northern Catalpa.
Microsphaera elevata Burr., Powdery Mildew. Marion.
Phyllosticta catalpae Ell. & Martin, Leaf Spot. Clay, George, and Jones.

CAULOPHYLLUM

C. THALICTROIDES (L.) Michx., Blue Cohosh.
Cercospora caulophylli Pk., Leaf Spot. Lafayette.

CEANOTHUS

C. AMERICANUS L., New Jersey Tea Ceanothus.
Phyllosticta ceanothi Miles, Leaf Spot. Marion.

CELASTRUS
C. SCANDENS L., Climbing Bittersweet.
Cercospora melanochaeta Ell. & Ev., Leaf Spot. Bolivar.
Ramularia celastri Ell. & Martin, Leaf Spot. Attala, Lafayette, and Tunica.

CELOSIA
C. SP., Cockscomb.
Heterodera marioni (Cornu) Goodey, Root-knot. Jasper.

CELTIS
C. MISSISSIPPIENSIS Bosc., Southern Hackberry.
Uncinula polychaete Berk. & Curt., Powdery Mildew. Benton.

C. OCCIDENTALIS L., Common Hackberry.
Uncinula parvula Cke. & Pk., Powdery Mildew. Clay.

C. SP.
Eutypella stellulata (Fr.) Sacc. Quitman.

CEPHALANTHUS
C. OCCIDENTALIS L., Button Bush.
Cercospora cephalanthi Ell. & Kell. Jefferson Davis.

CERASTIUM
C. VISCOSUM L., Mouse-ear Chickweed.
Peronospora alsinearum Casp., Downy Mildew. Oktibbeha.
Septoria cerastii Rob. & Desm., Leaf Spot. Hinds and Oktibbeha.

C. VULGATUM L., Large Mouse-ear Chickweed.
Isariopsis alborosella (Desm.) Sacc. Tallahatchie.
Septoria cerastii Rob. & Desm., Leaf Spot. Oktibbeha.

CERCIS
C. CANADENSIS L., Redbud.
Cercospora cercidicola Ell., Leaf Spot. Adams, Bolivar, Montgomery, and Newton.

CHAENOMELES
C. LAGENARIA (Lois.) Koidz., Common Flowering Quince.
Septobasidium retiforme (Berk. & Curt.) Pat., Canker. George.

CHAEROPHYLLUM
C. PROCUMBENS (L.) Crantz., Spreading Chervil.
Puccinia pimpinellae (Strauss) Mart., Rust. Holmes.

CHAMAECRISTA
C. MULTIPINNATA (Poll.) Greene, Manyleaved Sensitive Pea.
Ravenelia cassiaecola Atk., Rust. Oktibbeha.

CHELONE
C. GLABRA L., Snake-head.
Erysiphe galeopsidis DC., Powdery Mildew. Monroe.

CHENOPODIUM
C. ALBUM L., Lambsquarters Goosefoot.
Peronospora effusa (Grev.) Rab., Downy Mildew. Stone.

C. AMBROSIOIDES L., Mexican-Tea.
Cercospora anthelmintica Atk., Leaf Spot. Stone.
Phyllosticta ambrosioidis Thuem., Leaf Spot. Oktibbeha.

CHLORIS
C. SWARTZIANA Doell., Swartz's Chloris.
Cercospora caespitosa Ell. & Ev., Leaf Spot. Monroe.

CHRYSANTHEMUM
C. SP.
Cylindrosporium chrysanthemi Ell. & Dearn., Leaf Spot. Coahoma.
Heterodera marioni (Cornu) Goodey, Root-knot. Holmes, Tate, and Yazoo.
Puccinia chrysanthemi Roze, Rust. Marion.
Septoria chrysanthemella Sacc., Leaf Spot. Alcorn, Hinds, Jasper, Lauderdale, Tippah, and Washington.

CICUTA
C. MACULATA L., Spotted Waterhemlock.
Puccinia cicutae Lasch., Rust. Holmes.

CINNAMOMUM
C. CAMPHORA (L.) Nees & Eberm., Camphor-Tree.
Diplodia camphorae Tassi, Canker. Jackson.
Gloeosporium camphorae Sacc., Leaf Spot. Forrest and Harrison.

CIRCAEA
C. LUTETIANA L., Enchanter's Nightshade.
Puccinia circaeae Pers., Rust. Calhoun.

CIRSIUM
C. ARVENSE (L.) Scop., Canada Thistle.
Septoria cirsii Niessl, Leaf Spot. Tishomingo.

C. LANCEOLATUM (L.) Hill., Common Bur Thistle.
Puccinia cnici H. Mart., Rust. Oktibbeha.

CITRULLUS
C. VULGARIS Schrad., Watermelon.
Cercospora citrullina Cke., Leaf Spot. Webster.
Colletotrichum lagenarium (Pass.) Ell. & Halst., Anthracnose. Jackson, Lee, and Newton.

CITRULLUS--cont.
C. VULGARIS--cont.
Fusarium bulbigenum var. *niveum* (E. F. Sm.) Wollenweber, Wilt.
Fusarium oxysporum f. *niveum* (E. F. Sm.) Snyder & Hansen, Wilt. Practically state-wide.
Heterodera marioni (Cornu) Goodey, Root-knot. Lauderdale.

CITRUS
C. AURANTIUM L., Sour Orange.
Capnodium citri Berk. & Desm. Jackson.
Cladosporium citri Mass., Scab. Wayne.
Cladosporium herbarium (Pers.) ex Lk. var. *citricola* Fawc. & Burger, Jackson.
Colletotrichum gloeosporioides Penz., Wither Tip. Jackson.
Sporotrichum citri Butl., Scab. Jones and Pearl River.

C. GRANDIS, Pummelo.
Colletotrichum gloeosporioides Penz., Wither Tip. Jackson.
Sporotrichum citri Butl., Scab. Lamar.

C. NOBILIS Lour, King Orange.
Colletotrichum gloeosporioides Penz., Wither Tip. Forrest and Jackson.
Pestalozzia guepini Desm., Leaf Spot. Jackson.

C. NOBILIS Lour var. UNSHIU Swingle, Satsuma Orange.
Capnodium citri Berk. & Desm., Sooty Mold.
Cercospora aurantia Heald & Wolf, Leaf Spot. Stone.
Cladosporium citri Mass., Scab. Harrison and Jackson.
Colletotrichum gloeosporioides Penz., Wither Tip. Harrison and Jackson.
Sphaceloma fawcettii A. E. Jenkins, Scab.

C. RETICULATA, Tangerine.
Cladosporium citri Mass., Scab. Jackson.

C. SINENSIS P., Sweet Orange.
Cladosporium citri Mass., Scab. Harrison.

C. SP., Grapefruit.
Colletotrichum gloeosporioides Penz., Wither Tip. George.
Phomopsis citri Fawc., Melanose Stem End Rot. Harrison and Jackson.
Pseudomonas citri Hasse, Citrus Canker. Jackson.

C. SP.
Cladosporium citri Mass., Scab. George, Jackson, and Pearl River.
Colletotrichum gloeosporioides Penz., Wither Tip. George.
Myriangium duriaei Mont. & Berk. Jackson.
Septobasidium pseudopedicellatum Burt, Girdle and Canker. Jackson.

CLAYTONIA
C. VIRGINICA L., Spring Beauty.
Allodus claytoniata Arth. Oktibbeha.
Puccinia mariae-wilsoni G. W. Clint., Rust. Oktibbeha.

CLEMATIS
C. VIRGINIANA L., Virgin's Bower.
Ascochyta clematidina Thuem., Stem Rot and Leaf Spot. George.
Cylindrosporium clematidis Ell. & Ev., Leaf Spot. Jones and Noxubee.

COMANDRA
C. UMBELLATA (L.) Nutt., Common Comandra.
Cronartium comandrae Pk., Rust. Lafayette.

CONVOLVULUS
C. SEPIUM L., Hedge Bindweed.
Puccinia convolvuli (Pers.) Cast., Rust. Jones, Stone, and Tunica.
Septoria flagellaris Ell. & Ev., Leaf Spot. Marion.

COREOPSIS
C. SP.
Cercospora sp., Leaf Spot. Oktibbeha.

CORNUS
C. ALTERNIFOLIA L. f., Pagoda Dogwood.
Zythia aurantiaca (Peck) Sacc. George.

C. AMOMUM Mill., Swamp Dogwood.
Septoria cornicola Desm., Leaf Spot. Oktibbeha.

C. SP., Dogwood.
Cytospora cornui West. Yalobusha.

C. SP.
Glomerularia corni Pk., Anthracnose. Bolivar.
Meliola nidulans (Schw.) Cke., Sooty Mold. Forrest.
Septoria cornicola Desm., Leaf Spot. Quitman.

COTONEASTER
C. SP.
Phyllosticta cydoniae (Desm.) Sacc., Leaf Spot. Coahoma.

CRATAEGUS
C. COCCINEA L., Red Haw.
Gymnosporangium globosum Farl., Rust. Oktibbeha.
Podosphaera oxycanthae (DC.) DBy., Powdery Mildew. Bolivar.

CRATAEGUS--cont.
C. CRUS-GALLI L., Cockspur Thorn.
Gymnosporangium clavipes Cke. & Pk., Rust. Oktibbeha.
Gymnosporangium trachysorum Kern, Rust. Oktibbeha.
Podosphaera oxycanthae (DC.) DBy., Powdery Mildew. Hancock.

C. MARSHALLII Eggl., Parsley Haw.
Gymnosporangium trachysorum Kern, Rust. George.

C. MOLLIS (T. & G.) Scheele, Downy Hawthorn
Discosia artocreas Tode ex Fr., Leaf Spot. Oktibbeha.
Myriangium tuberculans Miles. Oktibbeha.
Septobasidium pedicillatum (Schw.) Pat., Canker. Oktibbeha.

C. SPATHULATA Michx., Small-fruited Thorn or Haw.
Gymnosporangium floriforme Thaxt., Rust. Oktibbeha.

C. SUBMOLLIS Sargent, Emerson's Thorn.
Gymnosporangium globosum Farl., Rust. Oktibbeha.

C. SP., Crabapple.
Gymnosporangium globosum Farl., Rust.

C. SP., Hawthorn.
Gymnosporangium clavipes Cke. & Pk., Rust. Oktibbeha.
Gymnosporangium globosum Farl., Rust. Forrest and Oktibbeha.

C. SP., Mayhaw.
Gymnosporangium globosum Farl., Rust.

C. SP.
Entomosporium thuemenii (Cke.) Sacc. Lafayette.
Gymnosporangium clavipes Cke. & Pk., Rust. Lowndes and Oktibbeha.

CROTALARIA
C. INTERMEDIA Kotschy, Crotalaria.
Fusarium bulbigenum var. *tracheiphilum*.

C. SPECTABILIS Roth, Showy Crotalaria.
Cercospora sp., Leaf Spot. Oktibbeha.
Corticium vagum Berk. & Curt., Basal Stem Canker.
Oidium erysiphoides Fr. var. *crotalariae* Ciferri & Fragoso.

CROTON
C. CAPITATUS Michx., Wooly Croton.
Bubakia crotonis (Cke.) Arth., Rust. Oktibbeha.
Phakopsora crotonis Arth., Rust. Oktibbeha.
C. MONANTHOGYNUS Michx., Single-fruited Croton
Bubakia crotonis (Cke.) Arth., Rust. Oktibbeha.
Phakopsora crotonis Arth., Rust. Oktibbeha.
Uromyces graminicola Burr., Rust. Covington.

CUCUMIS

C. MELO L., Muskmelon.
Alternaria brassicae var. *nigrescens*. Pegl., Leaf Spot. Simpson.
Macrosporium cucumerium Ell. & Ev., Leaf Blight. Rankin.
Sclerotium rolfsii Sacc., Southern Blight. Pearl River.

C. MELO var. CANTALUPENSIS, Cantaloupe.
Colletotrichum lagenarium (Pass.) Ell. & Halst., Anthracnose. Oktibbeha.
Heterodera marioni (Cornu) Goodey, Root-knot. Alcorn.
Pseudoperonospora cubensis (Berk. & Curt.)Rostow., Downy Mildew. Oktibbeha.

C. SATIVUS L., Cucumber.
Bacillus tracheiphilus E. F. Sm., Bacterial Wilt. Oktibbeha.
Colletotrichum lagenarium (Pass.) Ell. & Halst., Anthracnose. Claiborne, Harrison, Jackson, and Tishomingo.
Erysiphe cichoracearum DC., Downy Mildew. Jackson.
Heterodera marioni (Cornu) Goodey, Root-knot. Holmes, Jackson, and Stone.
Pseudoperonospora cubensis (Berk. & Curt.)Rostow., Downy Mildew. Oktibbeha and Pearl River.
Sclerotium rolfsii Sacc., Southern Blight. Pearl River.

CUCURBITA

C. PEPO L., Pumpkin.
Heterodera marioni (Cornu) Goodey, Root-knot. Harrison.

CYAS

C. REVOLUTA Thunb., Fern Palm.
Phoma bresadolae Sacc., Leaf Spot. Harrison.

CYCLAMEN

C. SP.
Heterodera marioni (Cornu) Goodey, Root-knot. Grenada.

CYDONIA

C. JAPONICA, Flowering Quince.
Cercospora cydoniae Ell. & Ev., Leaf Spot. Oktibbeha.

C. OBLONGA Mill., Common Quince.
Discosia artocreas Tode ex Fr., Leaf Spot. Harrison.
Entomosporium maculatum Lév., Leaf Blight. Pontotoc.
Fabraea maculata (Lev.) Atk., Leaf Blight. Harrison and Panola.
Gymnosporangium clavipes Cke. & Pk., Rust. Humphreys.

CYNODON

C. DACTYLON (L.) Pers., Bermuda Grass.
Physarum cinereum (Batsch) Pers., Slime Mold. Jones.
Puccinia cynodontis Lacroix., Rust. Oktibbeha.
Ustilago cynodontis Henn., Smut. Lamar.

CYPERUS
C. ROTUNDUS L., Nut Grass Flatsedge.
Puccinia canaliculata (Schw.) Lagerh., Rust. Washington.

C. STRIGOSUS L., Straw-colored Flatsedge.
Puccinia canaliculata (Schw.) Lagerh., Rust. Claiborne.

C. SP.
Puccinia cyperi Arth., Rust. Clarke.

CYRILLA
C. RACEMIFLORA L., Southern Leatherwood.
Aecidium cyrillae Arth., Rust. Jackson.
Lophodermium cyrillicola Tracy & Earle. Jackson.

CYSTOPTERIS
C. FRAGILIS (L.) Bernh., Brittle Bladderfern.
Hyalopsora polypodii (Pers.) Magn., Leaf Spot. Lafayette.

DACTYLIS
D. GLOMERATA L., Orchard Grass.
Scolecotrichum graminis Fckl., Leaf Blotch. Choctaw.

DACTYLOCTENIUM
D. AEGYPTIUM (L.) Willd., Crowfoot Grass.
Ustilago sparsa Underw., Smut. Leflore.

DAHLIA
C. SP.
Alternaria fasciculata (Cke. & Ell.) Jones & Grout, Leaf Spot. Clay.
Heterodera marioni (Cornu) Goodey, Root-knot. Attala, Grenada, Lamar, and Oktibbeha.

DASYSTOMA
D. VIRGINICA (L.) Britton, Smooth False Foxglove.
Cercospora gerardiae Ell. & Dearn., Leaf Spot. Noxubee.

DATURA
D. STRAMONIUM L., Jimsonweed.
Alternaria solani (Ell. & Mart.) Jones & Grout, Early Blight. George and Itawamba.
Macrosporium solani Ell. & Martin, Leaf Spot. Harrison and Tate.

DAUCUS
D. CAROTA L., Carrot.
Cercospora apii Fr. var. *carotae* Pass., Leaf Spot. Marshall.
Macrosporium carotae Ell. & Lam., Leaf Blight. Coahoma and Hinds.

DELPHINIUM
D. SP., Larkspur.
Sclerotium rolfsii Sacc., Southern Blight. Franklin.

DESMODIUM
D. CANADENSE (L.) DC., Canada Tickclover.
Ramularia desmodii Cke., Leaf Spot. Lawrence.
Uromyces hedysari-paniculati (Schw.) Farl., Rust. Choctaw and Oktibbeha.

D. CANESCENS DC., Hoary Ticktrefoil.
Synchytrium decipiens Farl. Forrest.

D. LONGIFOLIUM Nutt.
Uromyces hedysari-paniculati (Schw.) Farl., Rust. Alcorn.

D. MARILANDICUM (L.) DC., Maryland Tickclover.
Uromyces hedysari-paniculati (Schw.) Farl., Rust. Tishomingo.

D. PANICULATUM (L.) DC., Panicled Tickclover.
Parodiella perisporioides (Berk. & Curt.) Speg., Black Spot. Wayne.
Uromyces hedysari-paniculati (Schw.) Farl., Rust. Choctaw and Oktibbeha.

D. RIGIDUM DC., Rigid Tickclover
Parodiella perisporioides (Berk. & Curt.) Speg., Black Spot. Amite and Noxubee.
Uromyces hedysari-paniculati (Schw.) Farl., Rust. Oktibbeha.

D. SP.
Parodiella perisporioides (Berk. & Curt.) Speg., Black Spot. Hinds.
Uromyces hedysari-paniculati (Schw.) Farl., Rust. Oktibbeha.

DEUTZIA
D. SP.
Heterodera marioni (Cornu) Goodey, Root-knot. Covington.

DIANTHUS
D. BARBATUS L., Sweet-William.
Puccinia arenariae (Schum.) Wint., Rust. Marion and Monroe.

D. CARYOPHYLLUS L., Carnation.
Alternaria dianthi Stev. & Hall., Leaf Spot. Simpson.

D. SP., Carnation.
Alternaria dianthi Stev. & Hall., Leaf Spot. Harrison.
Heterodera marioni (Cornu) Goodey, Root-knot. Lee.
Septoria dianthi Desm., Leaf Spot. Hinds.
Uromyces caryophyllinus (Schr.) Wint., Rust. Lauderdale, Lee, and Washington.

DICHONDRA
D. CAROLINENSIS Michx., Dichondra.
Puccinia dichondrae Mont., Rust. Harrison.

DIERVILLA
D. SP., Bushhoneysuckle.
Septoria diervillae Ell. & Ev., Leaf Spot. Simpson.

DIGITARIA
D. SANGUINALIS (L.) Scop., Hairy Crabgrass.
Tilletia corona Scribn., Smut. Marion.
Tilletia pulcherrima Ell. & Gall., Smut. Perry.
Ustilago rabenhorstiana Kuehn, Smut. Coahoma, Lee, Oktibbeha, and Winston.

DIODIA
D. TERES Walt., Rough Buttonweed.
Cercospora diodiae Cke., Leaf Spot. Pearl River.
Cercospora diodiae-virginianae Atk., Leaf Spot. Pearl River.
Uromyces spermacoces (Schw.) Curt., Rust. Choctaw, Marion, and Oktibbeha.

DIOSPYROS
D. KAKI L. f., Japanese Persimmon.
Gloeosporium diospyri Ell. & Ev., Leaf Spot. Jackson.

D. VIRGINIANA L., Common Persimmon.
Cercospora diospyri (Thuem.) Cke., Leaf Spot. Oktibbeha.
Cercospora flexuosa Tracy & Earle. Oktibbeha.
Cercospora fuliginosa Ell. & Kell., Leaf Spot. Lamar.
Clasterosporium sp. Lamar.
Gloeosporium diospyri Ell. & Ev., Leaf Spot. Oktibbeha.

DISTICHLIS
D. SPICATA (L.) Greene, Seashore Saltgrass.
Physalospora cynodontis DeLac. George.

DUCHESNEA
D. INDICA (Andr.) Focke, Indian Strawberry.
Frommea duchesneae Arth. Harrison and Hinds.
Kuehneola duchesneae Arth., Rust. Hinds.

ECHINOCHLOA
E. CRUS-GALLI (L.) Beauv., Barnyardgrass.
Vermicularia affinis S. & E. Forrest.

ECHIUM
E. VULGARE L., Blueweed
Cercospora echii Wint., Leaf Spot. Bolivar.

ELAEAGNUS
E. SP., Silverberry
Cercospora elaeagni Heald & Wolf, Leaf Spot. Coahoma.

E. SP.
Phyllosticta argyrea Speg., Leaf Spot. Washington.

ELEOCHARIS
E. OBTUSA (Willd.) Schultes, Blunt Spikesedge.
Puccinia eleocharidis Arth., Rust. Tishomingo.

ELEPHANTOPUS
E. CAROLINIANUS Willd., Carolina Elephant's Foot.
Coleosporium elephantopodis (Schw.) Thuem., Rust. George, Lafayette, Oktibbeha, and Perry.

E. NUDATUS A. Gray, Smoothish Elephant's Foot.
Coleosporium elephantopodis (Schw.) Thuem., Rust. Oktibbeha and Perry.

E. TOMENTOSUS L., Tobaccoweed.
Coleosporium elephantopodis (Schw.) Thuem., Rust. Oktibbeha.

ELYMUS
E. CANADENSIS L., Canada Wild-Rye.
Phyllachora graminis (Pers. ex Fr.) Fckl., Black Spot. Oktibbeha.
Puccinia graminis Pers., Rust. Oktibbeha.
Urocystis agropyri (Preuss) Schroet., Smut. Oktibbeha.

E. VIRGINICUS L., Virginia Wild-Rye.
Septoria bromi Sacc., Leaf Spot. Holmes.

ERAGROSTIS
E. SP., Grass.
Helminthosporium geniculatum Tracy & Earle, Leaf Spot. Claiborne.

E. SP.
Dinemasporium gramineum Lév. Carroll.

ERIANTHUS
E. CONTORTUS Ell., Beardgrass.
Cerebella andropogonis Ces., False Smut. Bolivar.

ERIGERON
E. ANNUUS (L.) Pers., Sweet Scabious.
Septoria erigerontis Pk., Leaf Spot. Oktibbeha.

E. PHILADELPHICUS L., Philadelphia Fleabane.
Cercosporella cana (Pass.) Sacc. Oktibbeha.
Puccinia asterum Kern., Rust. Oktibbeha.
Puccinia extensicola asteris (Thuem.) Arth., Rust. Oktibbeha.
Puccinia extensicola erigerontis Arth., Rust. Oktibbeha.
Virus, Aster Yellows.

EUONYMUS

E. ATROPURPUREUS Jacq., Burningbush.
Microsphaera alni (DC.) Wint., Powdery Mildew. Pearl River.

E. JAPONICUS Thunb., Evergreen Burningbush.
Cercospora destructiva Rav., Leaf Spot. Forrest.
Colletotrichum griseum Heald & Wolf, Anthracnose. Adams, Coahoma, George, Grenada, Harrison, Jones, Kemper, Lauderdale, Leflore, Monroe, Noxubee, Oktibbeha, and Wayne.
Exosporium concentricum Heald & Wolf, Leaf Spot. Alcorn and Lowndes.
Glomerella cingulata (Stonem.) Spauld. & Schrenk., Anthracnose. Hinds, Lauderdale, and Oktibbeha.
Oidium euonymi-japonici (Arcang.) Sacc., Powdery Mildew. Adams, Clarke, Copiah, Harrison, Jefferson, Lauderdale, Pike, and Walthall.
Oidium sp., Powdery Mildew. Jones.

E. SP.
Heterodera marioni (Cornu) Goodey, Root-knot. Greene and Holmes.
Microsphaera alni (DC.) Wint., Powdery Mildew. Tunica.
Phyllosticta euonymi Sacc., Leaf Spot. Marshall.

EUPATORIUM

E. COELESTINUM L., Mistflower Eupatorium.
Puccinia conoclini Seym., Rust. Newton and Oktibbeha.

E. PERFOLIATUM L., Common Thoroughwort.
Septoria eupatorii Rob. & Desm., Leaf Spot. Oktibbeha.

E. ROTUNDIFOLIUM L., Roundleaf Thoroughwort.
Puccinia eleocharidis Arth., Rust. Harrison.

E. URTICAEFOLIUM Reichard, White Snakeroot.
Cercospora ageratoidis Ell. & Ev., Leaf Spot. Yalobusha.
Entyloma compositarum Farl., Leaf Smut. Rankin.
Puccinia tenuis (Schw.) Burr., Rust. Lafayette.

E. SP.
Puccinia eleocharidis Arth., Rust. Harrison.

EUPHORBIA

E. COROLLATA L., Flowering Spurge Euphorbia.
Microsphaera euphorbiae (Pk.) Berk. & Curt., Powdery Mildew. Tippah.

E. HETEROPHYLLA L., Painted Euphorbia.
Uromyces proëminens (DC.) Pass., Rust. Jones.

E. HUMISTRATA Engelm., Hairy Spreading Spurge.
Uromyces proëminens (DC.) Pass., Rust. Jackson.

EUPHORBIA--cont.

E. MACULATA L., Spotted Euphorbia.
Nigredo proëminens Arth., Rust. Stone.
Scolecotrichum euphorbiae Tracy & Earle, Leaf Spot. Jones.

E. MARGINATA Pursh, Snow-on-the-Mountain Euphorbia.
Puccinia panici Diet., Rust. Simpson.

E. SERPYLLIFOLIA Pers., Thymeleaf Spurge.
Peronospora euphorbiae Fckl., Downy Mildew. Jackson.
Uromyces proëminens (DC.) Pass., Rust. Jackson.

E. SP.
Uromyces prëominens (DC.) Pass., Rust. Sunflower.

FAGUS

F. GRANDIFOLIA Ehrh., American Beech.
Asterosporium hoffmani Kunze. Lee.
Diatrype virescens (Schw.) Cke. Union.
Phyllactinia corylea (Pers.) Karst., Powdery Mildew. Oktibbeha.
Polyporus versicolor (L.) Fr. Rankin.

F. SYLVATICA L., European Beech.
Phyllactinia corylea (Pers.) Karst., Powdery Mildew. Oktibbeha.

FICUS

F. CARICA L., Fig.
Cercospora bolleana (Thurston) Sacc., Leaf Spot. Forrest, Jackson, Wilkinson, and Yalobusha.
Cercospora fici Heald & Wolf, Leaf Spot. Harrison and Jackson.
Corticium laetum Karst., Limb Blight. Hancock, Stone, and Tate.
Corticium stevensii Burt, Leaf Blight. Lamar and Pike.
Gloeosporium sp., Fruit Rot or Anthracnose. Yazoo.
Glomerella fructigena (Clint.) Sacc., Anthracnose. Jackson.
Heterodera marioni (Cornu) Goodey, Root-knot. George, Hancock, Hinds, Lauderdale, Lee, Noxubee, and Oktibbeha.
Macrophoma fici Alm. & Cam., Canker.
Physopella fici Arth., Rust.
Rhizoctonia microsclerotia Matz., Leaf Blight. Amite, Hancock, and Pearl River.
Tubercularia fici Edg. Jefferson.

F. ELASTICA Roxb., Indiarubber Fig: Rubberplant.
Glomerella cincta (Stonem.) Spauld. & Schrenk, Anthracnose. Lamar.

FIMBRISTYLIS

F. AUTUMNALIS (L.) R. & S., Slender Umbelled Spikerush.
Cintractia axicola (Berk.) Cornu, Smut. Jackson, Marion, and Scott.
Ustilago fimbristylis Thuem., Smut. Lauderdale.

FORSYTHIA

F. SP.
Coryneum kunzei Cda., Blight. Jackson.
Heterodera marioni (Cornu) Goodey, Root-knot. Clay, Covington, and Leflore.

FORTUNELLA

F. HINDSI, Hongkong Kumquat.
Phyllosticta sp., Leaf Spot. Harrison.

F. SP., Kumquat
Diaporthe citri Wolf, Melanose.
Stereum albobadium (Schw.) Fr. Jackson.

FRAGARIA

F. VIRGINIANA Duchesne, Virginia Strawberry.
Diplocarpon earliana (Ell. & Ev.) Wolf, Leaf Scorch. Monroe.
Mycosphaerella fragariae (Tul.) Lindau, Leaf Spot. Alcorn, Calhoun, Claiborne, Clarke, Jackson, Lafayette, Lauderdale, Leake, Lowndes, Marshall, Monroe, Montgomery, Oktibbeha, and Webster.
Phoma obscurans Ell. & Ev. Pontotoc.

F. SP.
Botrytis vulgaris (Pers.) Fr., Gray Mold. Attala and Lauderdale.
Dendrophoma obscurans (Ell. & Ev.) H. W. Anderson, Leaf Scorch.
Diplocarpon earliana (Ell. & Ev.) Wolf, Leaf Scorch.
Heterodera marioni (Cornu) Goodey, Root-knot. Jackson and Lauderdale.
Mycosphaerella fragariae (Tul.) Lindau, Leaf Spot.
Pezizella lythri Shear & Dodge, Tan Rot.
Sphaerella earliana Wint. Lauderdale.

FRAXINUS

F. AMERICANA L., White Ash.
Piggotia fraxini Berk. & Curt., Leaf Spot. Oktibbeha and Tishomingo.

F. PENNSYLVANICA Marsh., Red Ash.
Piggotia fraxini Berk. & Curt., Leaf Spot. Webster.
Puccinia fraxinata Arth., Rust. Harrison.
Puccinia peridermiospora (Ell. & Tracy) Arth., Rust. Scott.

F. SP., Dead wood of
Apiosporium erysiphioides Sacc. & Ell. Simpson.

F. SP.
Cylindrosporium minus Ell. & Kell., Leaf Spot. Chickasaw.
Dimerosporium pulchrum Sacc. Quitman.
Poria punctata Fr. Webster.

GALAX
G. SP.
Asterina leemingii Ell. & Ev. Alcorn.

GALIUM
G. APARINE L., Catchweed Bedstraw.
Puccinia punctata Lk., Rust. Oktibbeha.

G. CONCINNUM Torr. & Gray, Shining Bedstraw.
Puccinia punctata Lk., Rust. Pearl River.

GARDENIA
G. SP.
Heterodera marioni (Cornu) Goodey, Root-knot. Greene, Harrison, Lauderdale, Leflore and Monroe.

GAURA
G. ANGUSTIFOLIA Michx., Narrowleaf Gaura.
Uromyces plumbarius Pk., Rust. Oktibbeha.

G. COCCINEA Pursh, Scarlet Gaura.
Uromyces plumbarius Pk., Rust. Wilkinson.

GERANIUM
G. CAROLINIANUM L., Carolina Geranium.
Pestalozziella subsessilis Sacc. & Ell., Leaf Spot. Oktibbeha.
Rhysotheca geranii (Pk.) Wils. Oktibbeha.

GEUM
G. CANADENSE Jacq., White Avens.
Peronospora potentillae DBy., Downy Mildew. Clay and Monroe.

GINKGO
G. BILOBA L.
Heterodera marioni (Cornu) Goodey, Root-knot. Stone.

GLADIOLUS
G. SP.
Bacterium marginatum L. McCul., Stem Rot.
Fusarium sp., Bulb Rot.
Heterodera marioni (Cornu) Goodey, Root-knot. Lee.
Penicillium gladioli McCul. & Thom, Storage Rot. Lee.
Saccharomyces sp., Yeast. Lauderdale.
Septoria gladioli Pass., Hard Rot, Leaf Spot. Alcorn, Harrison, Jackson, Pearl River, and Warren.

GLEDITSIA
G. TRIACANTHOS L., Honeylocust.
Cercospora olivacea (Berk. & Rav.) Ell., Leaf Spot. Sunflower.
Cercospora seymouriana Wint., Leaf Spot. Sunflower.

GLEDITSIA--cont.

G. TRIACANTHOS--cont.

Melasmia gleditschiae (Lév.) Ell. & Ev., Tar Spot. Carroll and Monroe.

Microsphaera ravenelii Berk., Powdery Mildew. Attala and Kemper.

Myriangium duriaei Mont. & Berk. Pearl River.

Nummularia discreta (Schw.) Tul., Canker. Calhoun.

GLYCERIA

G. FLUITANS (L.) R. Br., Water Mannagrass.

Ustilago longissima (Sow.) Tul. var. *macrospora* Davis, Smut. Rankin.

GNAPHALIUM

G. PURPUREUM L., Purplish Cudweed.

Cercospora gnaphaliacea Cke., Leaf Spot. Pearl River.

Plasmopara halstedii (Farl.) B. & DeT., Downy Mildew. Union.

GOSSYPIUM

G. HERBACEUM L., Levant Cotton.

Alternaria gossypii Auct., Leaf Spot. Holmes.

Glomerella gossypii (South.) Edg., Anthracnose. Lamar.

Phyllosticta gossypina Ell. & Martin, Leaf Spot. Madison.

Ramularia areola Atk., Frosty Mildew. Choctaw and Clarke.

G. HIRSUTUM L., Upland Cotton.

Agrobacterium tumefaciens (E. F. Sm. & Town) Conn., Crown Gall. Oktibbeha.

Alternaria gossypii Auct., Leaf Spot. State-wide.

Alternaria sp., Leaf Spot.

Ascochyta gossypii Syd., Blight. Bolivar and Tunica.

Cercospora gossypina Cke., Leaf Spot.

Diplodia gossypina Cke., Boll Rot.

Fusarium oxysporum f. *vasinfectum* (Atk.) Snyder & Hansen, Wilt. Montgomery.

Fusarium vasinfectum Atk., Wilt.

Fusarium spp., Boll Rot.

Glomerella gossypii (South.) Edg., Anthracnose.

Macrosporium nigricantium Atk., Leaf Spot. Clay.

Myrothecium roridum Tode, (assoc. with leaf spot).

Phoma sp., Leaf Spot. Tunica.

Ramularia areola Atk., Frosty Mildew. Lafayette and Panola.

Rhizoctonia solani Kuehn, Leaf Blight and Sore Shin.

Septocylindrium areola (Atk.) Pk. & Clint., Leaf Spot. Noxubee.

Thielaviopsis basicola (Berk.) Ferr., Collar Rot, Seedling Root Rot. Oktibbeha.

Verticillium albo-atrum R. & B., Verticillium Wilt. Benton, Bolivar, Coahoma, Claiborne, DeSoto, Humphreys, Lafayette, Leake, Leflore, Marshall, Panola, Sunflower, Tallahatchie, Tunica, Union, and Washington.

GOSSYPIUM--cont.
G. HIRSUTUM--cont.
Xanthomonas malvacearum (E. F. Sm.) Dowson, Black Arm, Angular Leaf Spot. Clay, Humphreys, Noxubee, Tallahatchie, Union, and Washington.

G. SP.
Heterodera marioni (Cornu) Goodey, Root-knot. Choctaw, Clarke, Leake, Leflore, Pearl River, Tate, Tishomingo, and Washington.

HAMAMELIS
H. VIRGINIANA L., Common Witchhazel.
Gonobotryum maculicola (Wint.) Sacc., Leaf Spot. Tishomingo.
Phyllosticta hamamelidis Pk., Leaf Spot. Harrison and Wayne.
Podosphaera binuncinata Cke. & Peck, Powdery Mildew. Franklin and Perry.

HEDERA
H. HELIX L., English Ivy.
Phyllosticta concentrica Sacc., Leaf Spot. Jackson.
Phyllosticta hedericola Dur. & Mont., Leaf Spot. Washington.
Vermicularia trichella Fr. Jefferson Davis and Tippah.

HELIANTHUS
H. ANGUSTIFOLIUS L., Swamp Sunflower.
Puccinia helianthi Schw., Rust. Tishomingo.

H. ANNUUS L., Common Sunflower
Puccinia helianthi Schw., Rust. Lowndes.
Septoria helianthi Ell. & Kell., Leaf Spot. Noxubee.
H. ATRORUBENS L., Hairy Wood Sunflower.
Puccinia helianthi Schw., Rust. Alcorn.

H. DIVARICATUS L., Woodland Sunflower.
Dicaeoma helianthi-mollis Arth., Rust. Jones.
Montagnella heliopsidis (Schw.) Sacc. Oktibbeha.
Puccinia helianthi Schw., Rust. Jones.

H. GIGANTEUS L., Giant Sunflower.
Coleosporium helianthi (Schw.) Arth., Rust. Oktibbeha.

H. HIRSUTUS Raf., Stiffhaired Sunflower.
Erysiphe cichoracearum DC., Powdery Mildew. Pearl River.
Puccinia helianthi Schw., Rust. Choctaw.

H. MOLLIS Lam., Ashy Sunflower
Puccinia helianthi Schw., Rust. Alcorn.

H. TUBEROSUS L., Jerusalem Artichoke Sunflower.
Erysiphe cichoracearum DC., Powdery Mildew. Rankin.

HELIANTHUS--cont.

- H. SP., Sunflower.
  - *Erysiphe cichoracearum* DC., Powdery Mildew. Oktibbeha.

HIBISCUS

- H. ESCULENTUS L., Okra.
  - *Cercospora hibisci* Tracy & Earle, Leaf Spot. Jackson, Madison, and Tippah.
  - *Cercospora* spp., Leaf and Pod Spot.
  - *Heterodera marioni* (Cornu) Goodey, Root-knot. Attala, Choctaw, Clarke, Clay, Forrest, Harrison, Holmes, Humphreys, Jackson, Jasper, Jones, Lauderdale, Leake, Leflore, Neshoba, Newton, Tippah, Warren, Washington, Wayne, Webster, and Winston.
- H. SYRIACUS L., Shrub Althea, Rose-of-Sharon.
  - *Kuehneola malvicola* (Speg.) Arth., Rust. Jackson and Jones.

HORDEUM

- H. JUBATUM L., Foxtail Barley.
  - *Puccinia graminis* Pers., Stem Rust. Hancock.
- H. NODOSUM L., Meadow Barley.
  - *Uromyces hordeinus* Arth., Rust. Lauderdale.
- H. PUSILLUM Nutt., Little Barley.
  - *Erysiphe graminis* DC., Powdery Mildew. Oktibbeha and Yalobusha.
  - *Uromyces hordei* Tracy, Leaf Rust. Oktibbeha.
- H. VULGARE L., Barley.
  - *Helminthosporium sativum* (Pam.) King & Bakke, Spot-Blotch. Oktibbeha.
  - *Helminthosporium* sp., Leaf Spot.
  - *Puccinia anomala* Rostr., Leaf Rust.
  - *Ustilago hordei* (Pers.) Kell. & Swing., Loose Smut. Issaquena, Jackson, and Oktibbeha.
  - *Ustilago nuda* (Jens.) Kell. & Swing., Loose Smut. Oktibbeha and Warren.

HOUSTONIA

- H. COERULEA L., Bluets.
  - *Aecidium oldenlandianum* Ellis & Tr., Rust. Oktibbeha.
  - *Peronospora seymourii* Burr., Downy Mildew. Oktibbeha.
  - *Uromyces peckianus* Farl., Rust. Oktibbeha.
- H. PURPUREA L., Large Houstonia.
  - *Uromyces peckianus* Farl., Rust. Oktibbeha.

HYDRANGEA

- H. ARBORESCENS L., Smooth Hydrangea.
  - *Botrytis cinerea* Pers., Blight. Wayne.
  - *Pucciniastrum hydrangeae* (Berk. & Curt.) Arth., Rust. Covington.
  - *Septoria hydrangeae* Bizz., Leaf Spot. Franklin.

HYDRANGEA
H. SP.
Cercospora hydrangeae Ell. & Ev., Leaf Spot. Forrest and Oktibbeha.
Gloeosporium sp., Leaf Spot. Hinds.
Heterodera marioni (Cornu) Goodey, Leaf Spot. Tunica.
Septoria hydrangeae Bizz., Leaf Spot. Lauderdale, Tallahatchie, and Washington.

HYDROCOTYLE
H. UMBELLATA L., Umbellata Marsh Pennywort.
Puccinia hydrocotyles (Link.) Cke., Rust. Jackson.

H. VERTICILLATA Thunb., Marsh Pennywort.
Cercospora hydrocotyles Ell. & Ev., Leaf Spot. Jones.

H. SP.
Septoria hydrocotyles Desm., Leaf Spot. Jackson.

HYPERICUM
H. MUTILUM L., Dwarf St. Johnswort.
Nigredo hyperici-frondosi Arth., Rust. Lafayette.

H. PROLIFICUM L., Shrubby St. Johnswort.
Uromyces hyperici (Spreng) Curt., Rust. Hinds.

HYPOXIS
H. HIRSUTA (L.) Coville, Common Goldstargrass.
Uromyces affinis Wint., Rust. Jackson.

HYSTRIX
H. PATULA Moench, Bottlebrush Grass.
Septoria bromi Sacc., Leaf Spot. Calhoun.

ILEX
I. CORIACEA (Pursh) Chapm., Shining Inkberry.
Asterina pelliculosa Berk. Jackson and Smith.
Aulographum angustiforme (Tracy & Earle) Thiess. Jackson.
Lembosia angustiformis Tracy & Earle. Jackson.

I. DECIDUA Walt., Possumhaw.
Rhytisma velatum (Schw.) Fr., Tar Spot. Forrest.

I. OPACA Ait., American Holly.
Asterina pelliculosa Berk. Newton.
Cercospora ilicis Ell., Leaf Spot. Oktibbeha.
Macrosporium fasciculatum Cke. & Ell., Leaf Spot. Bolivar.
Phyllosticta opaca Ell. & Ev., Leaf Spot. Jackson.
Placosphaeria ilicus Miles. Harrison.
Rhytisma curtisii Berk. & Rav., Tar Spot. Harrison and Leflore.

ILEX--cont.
I. VERTICILLATA (L.) A. Gray, Winterberry.
Micropera caespitosa (Pkr.) Archer. Panola.
Rhytisma ilicis-canadensis Schw., Tar Spot. Noxubee and Oktibbeha.

ILLICIUM
I. FLORIDANUM Ellis, Florida Anisetree.
Asteridium illicii Tracy & Earle. Jefferson Davis.
Laestadia illiciicola Tracy & Earle. Jackson.
Lembosia illiciicola Tracy & Earle. Jackson.

IMPATIENS
I. BIFLORA Walt., Spotted Touch-Me-Not.
Puccinia rubigo-vera (DC.) Wint., Rust. Holmes and Winston.
Puccinia rubigo-vera impatientis (Arth.) Mains., Rust. Holmes and Winston.
Rhysotheca obducens (Schroet) Wils. Clay.

I. PALLIDA Nutt., Pale Touch-Me-Not.
Puccinia argentata (Schultz) Wint., Rust. Attala.
Puccinia rubigo-vera (DC.) Wint., Rust. Choctaw.

IPOMOEA
I. BARBIGERA Sweet., Bearded Morning-glory.
Coleosporium ipomoeae (Schw.) Burr., Rust. Adams.

I. BATATAS (L.) Lam., Sweetpotato.
Actinomyces ipomoea Person, Soil Rot.
Albugo ipomoeae-panduranae (Schw.) Swing., White Rust. Adams, Amite, Holmes, and Tishomingo.
Ceratostomella fimbriata Elliott, Black Rot. Leflore, Oktibbeha, and Wayne.
Colletotrichum sp. (assoc. with leaf spot)
Fusarium batatatis Wollenw., Stem Rot.
Fusarium hyperoxysporum Wollenw., Stem Rot.
Fusarium spp., Wilt.
Heterodera marioni (Cornu) Goodey, Root-knot. Attala, Bolivar, Holmes, Itawamba, Jackson, Jasper, Lauderdale, Leake, Lee, Pike, and Tunica.
Monilochaetes infuscans Ell. & Halsted, Scurf.
Phyllosticta batatas (Thum.) Cke., Leaf Spot. George, Jackson, and Jones.
Physarum plumbeum Fr., Slime Mold. Forrest, Marshall, and Warren.
Physorella oblonga (Berk. & Curt.) Morg. Greene.
Plenodomus destruens Harter, Foot Rot. Chickasaw, Coahoma, Marshall, Oktibbeha, Quitman, and Wilkinson.
Rhizopus nigricans Ehrenb. ex Fr., Soft Rot.

IPOMOEA--cont.

I. BATATAS--cont.

Sclerotium rolfsii Sacc., Southern Blight. Adams, Hinds, and Marshall.
Septoria sp. Leaf Spot.
Sphaeronema fimbriatum (Ell. & Halst.) Sacc., Black Rot. Webster.
Stemonitis fusca (Roth) Rost., Slime Mold. Madison.
Virus, Mosaic. Pontotoc.

I. DIGITATA L., Fingerleaf Morning-glory.
Coleosporium ipomoeae (Schw.) Burr., Rust. Coahoma.

I. HEDERACEA Jacq., Ivyleaf Morning-glory.
Albugo ipomoeae-panduranae (Schw.) Swing., White Rust. Jackson and Montgomery.
Coleosporium ipomoeae (Schw.) Burr., Rust. Jackson.
Cystopus ipomoeae-panduranae Farl. Lauderdale.

I. LACUNOSA L., White Morning-glory.
Coleosporium ipomoeae (Schw.) Burr., Rust. Alcorn.

I. PANDURATA (L.) Mey., Wild Potato Vine.
Albugo ipomoeae-panduranae (Schw.) Swing., White Rust. Oktibbeha.
Coleosporium ipomoeae (Schw.) Burr. Rust. Coahoma.
Phyllosticta ipomoeae Ell. & Kell., Leaf Spot. Jackson.

I. PURPUREA (L.) Roth, Common Morning-glory.
Albugo ipomoeae-panduranae (Schw.) Swing., White Rust. Marion.
Coleosporium ipomoeae (Schw.) Burr., Rust. Adams.

I. SP., Morning-glory.
Coleosporium ipomoeae (Schw.) Burr., Rust. Oktibbeha.

IRIS

I. VERSICOLOR L., Blueflag Iris.
Mollisia iridis (Rehm.) Sacc. Bolivar.

I. SP.
Didymellina iridis (Desm.) V. Hoehn., Leaf Spot. Neshoba and Washington.
Didymellina macrospora Kleb., Leaf Spot. Panola.
Puccinia iridis (DC.) Wallr., Rust. Lamar, Monroe, and Pike.
Sclerotium rolfsii Sacc., Southern Blight. Oktibbeha and Scott.
Scolecotrichum iridis Fautr. & Roum., Leaf Spot. Hinds, Leflore, Marshall, and Oktibbeha.
Virus, Mosaic.

JUGLANS

J. CINEREA L., Butternut.
Marssonia juglandis (Lib.) Sacc., Leaf Spot. Lafayette.

JUGLANS--cont.
J. NIGRA L., Eastern Black Walnut.
Cytospora juglandicola Ell. & Barth. Kemper and Leflore.
Marssonia juglandis (Lib.) Sacc., Leaf Spot. Bolivar.
Microstroma juglandis (Ber.) Sacc., Leaf Spot. Issaquena, Panola, and Yazoo.

J. SP., Walnut.
Cylindrosporium juglandis Wolf., Leaf Spot. Lauderdale.
Gnomonia leptostyla (Fr.) Ces. & DeN., Leaf Spot. Tunica.
Marssonia juglandis (Lib.) Sacc., Leaf Spot. Leflore.

JUNCUS
J. ACUMINATUS Michx., Sharpfruited Rush.
Cintractia junci (Schw.) Trel., Smut. Quitman.

JUNIPERUS
J. BERMUDIANA L., Bermuda Red Cedar.
Gymnosporangium bermudianum (Farl.) Earle, Rust. Harrison.

J. CHINENSIS L., Pyramid Chinese Juniper,
Pitya cupressi (Batsch) Fckl. Jefferson Davis.

J. PFITZERIANA, Pfitzer's Juniper.
Agrobacterium tumefaciens (E. F. Sm. & Town.) Conn, Crown Gall.

J. VIRGINIANA L., Eastern Red Cedar.
Gymnosporangium bermudianum (Farl.) Earle, Rust. Harrison.
Gymnosporangium clavipes Cke. & Pk., Rust. Oktibbeha and Washington.
Gymnosporangium floriforme Thaxt., Rust. Lowndes and Oktibbeha.
Gymnosporangium globosum Farl., Rust. Oktibbeha.
Gymnosporangium nidus-avis Thaxt., Rust. Washington.
Polyporus barbatulus (Fr.) Rav. Issaquena.

JUSSIAEA
J. DECURRENS (Walt.) DC., Water Primrose.
Puccinia jussiaeae Speg., Rust. Coahoma.

KALMIA
K. LATIFOLIA L., Mountain-laurel.
Phyllosticta kalmicola (Schw.) Ell. &Ev., Leaf Spot. Harrison.
Phyllosticta latifoliae Ell. & Ev., Leaf Spot. George.
Septoria kalmiaecola (Schw.)Berk. & Curt., Leaf Spot. Harrison.

KERRIA
K. JAPONICA DC., Japanese Kerria.
Coccomyces kerriae V. B. Stewart, Twig and Leaf Blight. Neshoba.

KOELLIA
K. MUTICA (Michx.) Britton, Short-toothed Mountain-mint.
Puccinia menthae Pers., Rust. Lee.

KOELLIA--cont.
- K. VIRGINIANA (L.) MacM., Virginia Mountain-mint.
  - *Puccinia menthae* Pers., Rust. Lafayette.

KRIGIA
- K. DANDELION (L.) Nutt., Dwarf-Dandelion.
  - *Bremia lactucae* Regel., Downy Mildew. Oktibbeha.
- K. VIRGINICA (L.) Willd., Carolina Dwarf-Dandelion.
  - *Puccinia maculosa* Schw., Rust. Hancock.

KUHNIA
- K. EUPATORIOIDES L., False Boneset.
  - *Puccinia kuhniae* Schw., Rust. Choctaw.

KYLLINGA
- K. PUMILA Michx., Low Kyllinga.
  - *Helminthosporium* sp., Leaf Spot. Oktibbeha.

LACTUCA
- L. CANADENSIS L., Canada Lettuce.
  - *Bremia lactucae* Regel., Downy Mildew. Choctaw.
  - *Dicaeoma hieraciatum* Arth. & Kern., Rust. Oktibbeha.
  - *Puccinia extensicola hieraciata* (Schw.) Arth., Rust. Oktibbeha.
  - *Septoria lactucicola* Ell.& Martin, Leaf Spot. Oktibbeha.
- L. SATIVA L., Garden Lettuce.
  - *Bremia lactucae* Regel., Downy Mildew. Copiah.
  - *Sclerotinia sclerotiorum* (Lib.) Massee, Watery Soft Rot.

LAGERSTROEMIA
- L. INDICA L., Common Crapemyrtle.
  - *Erysiphe lagerstroemiae* West., Powdery Mildew. Chicasaw, Clarke, and Jasper.
  - *Uncinula australiana* McAlpine, Powdery Mildew.

LAMIUM
- L. AMPLEXICAULE L., Henbit Deadnettle
  - *Peronospora lamii* Braun, Downy Mildew. Coahoma.

LATHYRUS
- L. ODORATUS L., Sweetpea.
  - *Glomerella rufomaculans* (Berk.) Spauld. & Schrenk, Anthracnose. Oktibbeha.

LEERSIA
- L. LENTICULARIS Michx., Catch-fly Grass.
  - Tilletia corona Scribn., Smut. Jefferson.

LEERSIA--cont.
L. ORYZOIDES Sw., Rice Cut-Grass.
Tilletia corona Scribn., Smut. Copiah.

L. VIRGINICA Willd., White Grass.
Uromyces halstedii DeT., Rust. Harrison.

LEPIDIUM
L. VIRGINICUM L., Virginia Pepperweed.
Albugo candida (Pers. ex Lév.) O. Kunze, White Rust. Harrison.
Peronospora parasitica (Pers.) DBy., Downy Mildew. Oktibbeha.
Septoria lepidiicola Ell. & Martin, Leaf Spot. Grenada.

LEPTOCHLOA
L. FILIFORMIS (Lam.) Beauv., Red Sprangletop.
Ustilago ornata Tracy & Earle, Smut. Rankin.

LESPEDEZA
L. CAPITATA Michx., Roundheaded Lespedeza.
Uromyces lespedezae-procumbentis (Schw.) Curt., Rust. Calhoun.

L. HIRTA (L.) Hornem., Hairy Lespedeza.
Uromyces lespedezae-procumbentis (Schw.) Curt., Rust. Tishomingo.

L. INTERMEDIA (Wats.) Britt., Wand Lespedeza.
Uromyces lespedezae-procumbentis (Schw.) Curt., Rust. Lee.

L. REPENS (L.) Bart., Creeping Lespedeza.
Nigredo lespedezae-procumbentis Arth., Rust. Calhoun.

L. STRIATA (Thunb.) H. & A., Common Lespedeza.
Microsphaera diffusa Cke. & Pk., Powdery Mildew. Neshoba.

L. VIOLACEA (L.) Pers., Violet Lespedeza.
Nigredo lespedezae-procumbentis Arth., Rust. Forrest.
Uromyces lespedezae-procumbentis (Schw.) Curt., Rust. Forrest.

LEUCOTHOË
L. AXILLARIS (Lam.) D. Don., Downy Leucothoë.
Exobasidium leucothoes Henn., Leaf Gall. Stone.
Mycosphaerella leucothoes Miles, Leaf Spot. Pearl River.

LIGUSTRUM
L. INDICUM, India Privet.
Glomerella cingulata (Stonem.) Spauld. & Schrenk. Jones.

L. JAPONICUM Thunb., Japanese Privet.
Cercospora ligustri Roum., Leaf Spot. Jefferson.

L. LODENSE
Cercospora ligustri Roum., Leaf Spot. Washington.

LIGUSTRUM--cont.

L. OVALIFOLIUM Hassk., California Privet.
Glomerella cingulata (Stonem.) Spauld. & Schrenk. George and Panola.

L. SP.
Cercospora ligustri Roum., Leaf Spot. Coahoma and Lauderdale.
Heterodera marioni (Cornu) Goodey, Root-knot. Greene and Stone.
Microsphaera alni (DC.) Wint., Powdery Mildew.
Phyllosticta ovalifolii Brun., Leaf Spot. Humphreys and Washington.

LIPPIA

L. LANCEOLATA Michx., Fogfruit.
Cercospora lippiae Ell. & Ev., Leaf Spot. Clay.

LIQUIDAMBAR

L. STYRACIFLUA L., American Sweetgum.
Cercospora liquidambaris Cke. & Ell., Leaf Spot. Bolivar, Monroe, Oktibbeha, and Stone.
Cercospora tuberculans Ell. & Ev., Leaf Spot. Lee.
Gnomoniella amoena (Nees) Fckl. var. petalorum (S.) Sacc., Leaf Spot. Copiah.
Hypoxylon perforatum (Schw.) Fr. Rankin.
Myriangium curtisii Berk. & Mont. Jackson.
Polyporus versicolor (L.) Fr. Greene.
Stereum fuscum Britz. Oktibbeha.
Stereum rameale Schw. Oktibbeha.

LIRIODENDRON

L. TULIPIFERA L., Tulip Tree.
Cercospora liriodendri Ell. & Harkn., Leaf Spot. Neshoba.
Hypoxylon insidens (S.) Ell. & Ev. Coahoma.
Oospora tulipifera Ell. & Martin. Tishomingo.
Phyllosticta liriodendrica Cke., Leaf Spot. George, Jackson, and Marion.

LOLIUM

L. MULTIFLORUM Lam., Ryegrass.
Puccinia rubigo-vera secalis (Erikss.) Carl., Rust. Jones.

LONICERA

L. JAPONICA Thunb., Japanese Honeysuckle.
Cercospora periclymeni Wint., Leaf Spot. Oktibbeha.

LUDWIGIA

L. ALTERNIFOLIA L., Seedbox.
Septoria ludwigiae Cke., Leaf Spot. Pearl River.

LUDWIGIA

L. HIRTELLA Raf., Hairy Ludwigia.

Puccinia jussiaeae Speg., Rust. Harrison, Jackson, and Oktibbeha.

LYCIUM

L. HALIMIFOLIUM Mill., Matrimony-Vine.

Puccinia tumidipes Pk., Rust. Harrison and Oktibbeha.

LYCOPERSICON

L. ESCULENTUM Mill., Common Tomato.

Alternaria solani (Ell. & Mart.) Jones & Grout, Early Blight. Copiah, DeSoto, Jackson, and Oktibbeha.

Bacterium solanacearum E. F. Sm., Bacterial Wilt.

Cladosporium fulvum Cke., Leaf Mold. Harrison, Jackson, Monroe, Pearl River, and Pike.

Fusarium lycopersici Sacc., Wilt.

Fusarium oxysporum f. *lycopersici* (Sacc.) Snyder & Hansen, Wilt. Oktibbeha.

Heterodera marioni (Cornu) Goodey, Root-knot. Attala, Choctaw, Clarke, Clay, Copiah, Covington, Forrest, George, Harrison, Holmes, Humphreys, Jackson, Jasper, Jones, Kemper, Leake, Leflore, Monroe, Neshoba, Oktibbeha, Sharkey, Sunflower, Tate, Washington, Wayne, and Yalobusha.

Phytomonas vesicatoria (Doidge) Bergey et al, Fruit Spot.

Phytophthora infestans (Mont.) DBy., Late Blight.

Sclerotium rolfsii Sacc., Southern Blight. Leflore.

Septoria lycopersici Speg., Leaf Spot. Copiah, Lawrence, Lowndes, and Oktibbeha.

LYONIA

L. LIGUSTRINA DC., Privet Andromeda.

Rhytisma discolorans Fr., Tar Spot. Tishomingo.

MACLURA

M. POMIFERA Schneider, Osage Orange.

Ovularia maclurae Ell. & Lang., Cottony Leaf Spot. Panola.

MAHONIA

M. SP.

Macrophoma sp. Coahoma.

MAGNOLIA

M. GRANDIFLORA L., Southern Magnolia.

Meliola amphitricha Fr., Sooty Mold.

Phyllosticta cookei Sacc., Leaf Spot. George and Harrison.

Sphaceloma sp., Anthracnose. Pearl River.

Trichodothis comata (Berk. & Rav.) Theiss. & Syd. Copiah, Hancock, and Yalobusha.

MAGNOLIA--cont.

M. VIRGINIANA L., Laurel Magnolia,

Apiosporium erysiphioides Sacc. & Ell. Simpson.
Dothidella concaviuscula (Ell. & Ev.) Theiss. & Syd. Wayne.
Meliola amphitricha Fr., Sooty Mold. Chickasaw.
Sphaerella annulata Cke. Pearl River.
Sphaerella glauca Cke. Franklin.
Trichodothis comata (Berk. & Rav.) Theiss. & Syd. Pearl River.

MALUS

M. BACCATA (L.) Borkh., Siberian Crabapple.

Agrobacterium tumefaciens (E. F. Sm. & Town.) Conn, Crown Gall. Washington.

M. IOENSIS (Wood) Britton, Western Crabapple.

Gymnosporangium juniperi-virginiana Schw., Cedar Rust. Hinds, Marshall, Webster, and Yazoo.

M. SYLVESTRIS Mill., Apple.

Armillaria mellea Vahl. ex Fries, Root Rot. Oktibbeha.
Cercospora mali Ell. & Ev., Leaf Spot. Tunica.
Corticium ochroleucum (Noack) Burt. Jackson.
Corticium stevensii Burt, Leaf Blight. George.
Gloeodes pomigena (Sacc.) Colby, Sooty Blotch. Tunica.
Glomerella cingulata (Stonem.) Spauld. & Schrenk, Bitter Rot. Harrison.
Gymnosporangium juniperi Lk., Rust. Washington.
Gymnosporangium juniperi-virginiana Schw., Cedar Rust. Calhoun, Lee, Oktibbeha, Scott, and Yazoo.
Hypochnus ochroleucus Noack. Prentiss.
Leptothyrium pomi (M. & F.) Sacc., Fly Speck. Oktibbeha.
Nummularia discreta (Schw.) Tul., Blister Canker. Washington.
Phyllosticta solitaria Ell. & Ev., Blotch. Adams, Jones, Newton, Scott, Tippah, and Union.
Physalospora cydoniae Arnaud, Black Rot, Canker, Leaf Spot. Chickasaw, Oktibbeha, and Smith.
Physalospora malorum (Pk.) Shear, Black Rot, Frog-eye. Attala, DeSoto, and Marion.
Podosphaera oxyacanthae (DC.) DBy., Powdery Mildew. Claiborne.
Septobasidium pedicillatum (Schw.) Pat., Canker. Tishomingo.
Septobasidium pseudopedicellatum Burt, Girdle and Canker. Choctaw, Lauderdale, and Lee.
Septobasidium retiforme (Berk. & Curt.) Pat., Canker. Lauderdale.
Sphaeropsis malorum Pk. Forrest.
Venturia inaequalis (Cke.) Wint., Scab. Simpson.

M. SP., Apple.

Corticium salmonicolor Berk. & Br. Jackson.
Heterodera marioni (Cornu) Goodey, Root-knot. Attala, Lee, Tippah, and Webster.

MALUS--cont.

M. SP., Flowering Crabapple.

Gymnosporangium juniperi-virginiana Schw., Cedar Rust. Warren and Yazoo.

MALVA

M. ROTUNDIFOLIA L., Running Mallow.

Cercospora althaeina Sacc., Leaf Spot. Jackson.

MEDICAGO

M. ARABICA (L.) Huds., Spotted Medic.

Ascochyta pisi Lib., Blight. Oktibbeha.

Cercospora medicaginis Ell. & Ev., Leaf Spot. Bolivar, Oktibbeha, and Washington.

Cercospora zebrina Pass., Leaf Spot. Bolivar and Washington.

Pleospora herbarum (Fr.) Rabh., Leaf Spot.

M. HISPIDA Gaertn., Toothed Medic, Bur Clover.

Cercospora medicaginis Ell. & Ev., Leaf Spot. Oktibbeha.

Cercospora zebrina Pass., Leaf Spot. Oktibbeha.

M. SATIVA L., Alfalfa

Cercospora medicaginis Ell. & Ev., Leaf Spot. Clay.

Colletotrichum trifolii Bain, Anthracnose. Clay, Harrison, Jackson, Jones, Oktibbeha, and Washington.

Pseudopeziza medicaginis (Lib.) Sacc., Leaf Spot. Coahoma, Lafayette, Newton, Oktibbeha, Sharkey, Simpson, Tallahatchie, Washington, and Yazoo.

Pyrenopeziza medicaginis Fckl., Yellow Leaf Blotch. Humphreys, Newton, and Union.

Uromyces striatus Schr., Rust. Bolivar.

Urophlyctis alfalfae (Lagh.) Magn., Crown Wart. Clay.

MELIA

M. AZEDARACH L., Chinaberry.

Cercospora leucosticta Ell. & Ev., Leaf Spot. George and Stone.

Cercospora meliae Ell. & Ev., Leaf Spot. George and Stone.

Colletotrichum sp., Anthracnose. Harrison.

MELICA

M. MUTICA Walt., Narrow Melicgrass.

Puccinia coronata Cda., Crown Rust. Lamar.

Puccinia melicae (Erikss.) Syd., Rust. Lamar.

MENISPERMUM

M. CANADENSE L., Canada Moonseed.

Cercospora menispermi Ell. & Holw., Leaf Spot. Calhoun.

MESADENIA
M. ATRIPLICIFOLIA (L.) Raf., Pale Indian Plantain.
Erysiphe cichoracearum DC., Powdery Mildew. Lafayette.

MIKANIA
M. SCANDENS (L.) Willd., Climbing Hempweed.
Puccinia spegazzinii DeT., Rust. Harrison.

MIMULUS
M. ALATUS Soland., Sharpwinged Monkeyflower.
Septoria mimuli Ell. & Kell., Leaf Spot. Bolivar and Oktibbeha.

MONARDA
M. FISTULOSA L., Wild Bergamot.
Puccinia menthae Pers., Rust. Jones.

MORUS
M. RUBRA L., Red Mulberry.
Cercospora moricola Cke., Leaf Spot. Lowndes.
Cercospora pulvinulata Sacc. & Wint., Leaf Spot. Lowndes.
Sclerotinia carunculoides Siegler & Jenkins, Popcorn Disease. Clarke, Hinds, Scott, and Washington.

M. SP.
Pseudomonas mori (Boyer & Lambert) F. S. Stevens, Bacterial Blight. Panola.

MUHLENBERGIA
M. MEXICANA (L.) Trin., Wirestem Muhly.
Puccinia muhlenbergiae Arth. & Holw., Rust. Choctaw.
Puccinia schedonnardi Kell. & Sw., Rust. Choctaw.

M. SCHREBERI Gmel., Nimblewill.
Phyllachora graminis (Pers. ex Fr.) Fckl., Black Spot. Perry.

M. SP., Grass.
Phyllachora graminis (Pers. ex Fr.) Fckl., Black Spot. Lauderdale.

MYOSOTIS
M. MACROSPERMA Engelm., Spring Scorpion Grass.
Peronospora myosotidis DBy., Downy Mildew. Oktibbeha.
Puccinia eatoniae myosotidis Mains, Rust. Oktibbeha.
Puccinia rubigo-vera apocrypta (Ellis & Tr.) Arth., Rust. Oktibbeha.

MYRICA
M. CAROLINENSIS Mill., Small Waxberry.
Asterella myricae Miles. Jackson.

MYRICA--cont.
M. CERIFERA L., Southern Waxmyrtle.
Cercospora penicillus Ell. & Ev., Leaf Spot. George.
Mycosphaerella myricae Miles, Leaf Spot. Jackson.

NARCISSUS
N. SP.
Heterodera marioni (Cornu) Goodey, Root-knot. Lauderdale.
Septoria narcissi Cass., Leaf Spot.

NERIUM
N. OLEANDER L., Common Oleander.
Gloeosporium oleandri Sacc., Leaf Spot. Harrison.
Macrosporium nerii Cke., Leaf Spot. Hinds.
Phyllosticta nerii West., Leaf Spot. Hancock.

NICOTIANA
N. SP., Tobacco.
Cercospora nicotianae Ell. & Ev., Frog-eye. Pike.

NYMPHAEA
N. SP., Waterlily.
Cercospora nymphaeacea Cke. & Ell., Leaf Spot. Lincoln.

NYSSA
N. SYLVATICA Marsh., Sour Gum.
Bjerkandera adusta (Willd. ex Fr.) Karst. Oktibbeha.
Septobasidium patouillardi Burt. Harrison.
Stereum lobatum (Kze.) Fr. Stone.

N. SP.
Glenospora curtisii B. & Desm. Washington.

OENOTHERA
O. BIENNIS L., Common Evening-primrose.
Puccinia extensicola Plowr., Rust. George and Oktibbeha.
Puccinia peckii Kell., Rust. Oktibbeha.
Septoria oenotherae West., Leaf Spot. George and Pearl River.

O. LACINIATA Hill, Cutleaf Evening-primrose.
Septoria oenotherae West., Leaf Spot. Carroll, George, Jackson, and Oktibbeha.
Synchytrium fulgens Schroet. Hinds.
Uromyces plumbarius Pk., Rust. Oktibbeha.

OPUNTIA
O. SP., Pricklypear.
Gloeosporium cactorum Ston., Anthracnose. Forrest, Holmes, and Oktibbeha.
Gloeosporium opuntiae Ell. & Ev., Anthracnose. Perry.

OSMANTHUS
O. AMERICANA (L.) Benth. & Hook., Devilwood, American Olive.
Meliola amphitricha Fr., Sooty Mold. Hancock.
Phyllosticta sinuosa Ell. & Martin, Leaf Spot. Wilkinson.

O. FRAGRANS (Thunb.) Lour, Sweet Osmanthus.
Asterina sp. Hinds.

OSMUNDA
O. CINNAMOMEA L., Cinnamon-Fern.
Leptostromella filicina (Berk. & Curt.) Sacc., Leaf Spot. Clay.

OSTRYA
O. VIRGINIANA (Mill.) Willd., Ironwood.
Corticium oakesii Berk. & Curt. Franklin.
Diatrype albopruinosa (Schw.) Cke. & Ell. Noxubee.
Phyllactinia corylea (Pers.) Karst., Powdery Mildew. Oktibbeha.
Phyllactinia suffulta (Reb.) Sacc., Powdery Mildew. Lawrence and Newton.
Valsa ambiens (Pers.) Fr. Hinds.

OXALIS
O. STRICTA L., Upright Yellow Woodsorrel.
Ustilago oxalidis Ell. & Tracy, Smut. Quitman.

O. VIOLACEA L., Violet Woodsorrel.
Puccinia oxalidis (Lév.) Diet. & Ell., Rust. Yazoo.
Puccinia sorghi Schw., Rust. Clay, Hinds, Jefferson, Lauderdale, and Yazoo.

PAEONIA
P. DELICATISSIMA, Peony.
Cladosporium paeoniae Pass., Leaf Mold. Coahoma and Lee.

P. SP.
Botrytis paeoniae Oud., Blight. Bolivar.
Cladosporium paeoniae Pass., Leaf Mold. Coahoma, Hinds, Oktibbeha, and Pike.
Heterodera marioni (Cornu) Goodey, Root-knot. Lafayette, Leflore, and Tunica.
Leptothyrium peronae Br. & Cav., Leaf Spot. Coahoma.

PANICULARIA
P. NERVATA (Willd.) Kuntze, Nerved Mannagrass.
Epichloe typhina (P. ex Fr.) Tul. Pontotoc.

PANICUM
P. AMARUM Ell., Small Seabeach Grass.
Phyllachora graminis (Pers. ex Fr.) Fckl., Black Spot. Washington.

PANICUM--cont.
P. ANCEPS Michx., Beaked or Flatstemmed Panic-grass.
Hypocrella hypoxylon (Pk.) Sacc. Pearl River.

P. CAPILLARE L., Common Witchgrass.
Puccinia emaculata Schw., Rust. Oktibbeha.

P. DICHOTOMUM L., Forked Panic-grass.
Phyllachora graminis (Pers. ex Fr.) Fckl., Black Spot. Noxubee.

P. HEMITOMUM Schult., Maidencane.
Physalospora oxystoma Sacc. & Ell. Hancock.

P. PROLIFERUM Lam., Sprouting Panic-grass.
Sorosporium syntherismae (Pk.) Farl., Smut. Oktibbeha.

P. VIRGATUM L., Switch Grass.
Uromyces graminicola Burr., Rust. Clarke.

P. SP., Grass.
Phyllachora graminis (Pers. ex Fr.) Fckl., Black Spot. Oktibbeha.

P. SP.
Dothichloë atramentosa (Berk. & Curt.) Atk., Black Crust. Jackson.
Ophiodothis atramentosa (Berk. & Curt.) Earle. Jackson.
Sorosporium syntherismae (Pk.) Farl., Smut. Oktibbeha.

PARTHENOCISSUS
P. QUINQUEFOLIA (L.) Planch., Virginia Creeper.
Cercospora pustula Cke., Leaf Spot. Jones.
Phyllosticta ampelopsidis Ell. & Martin, Leaf Spot. Jackson and Leflore.
Phyllosticta labruscae Thuem., Leaf Spot. Bolivar.
Phyllosticta viticola Sacc. & Speg., Leaf Spot. Jackson.
Uncinula necator (Schw.) Burr., Powdery Mildew. DeSoto.

P. TRICUSPIDATA (Sieb. & Zucc.) Planch., Japanese Creeper.
Phyllosticta ampelopsidis Ell. & Martin, Leaf Spot. Amite.

PASPALUM
P. DILATATUM Poir., Dallis Grass.
Claviceps paspali Stev. & Hall, Ergot. Marion, Oktibbeha, and Yazoo.
Phyllachora graminis (Pers. ex Fr.) Fckl., Black Spot. Lamar.

P. URVILLEI Steud., Vasey Grass.
Puccinia levis (Sacc. & Bizz.) Magn., Rust. Lamar.

P. SP.
Claviceps paspali Stev. & Hall, Ergot. Amite.
Puccinia levis (Sacc. & Bizz.) Magn., Rust. Harrison.

PELARGONIUM

P. SP., Geranium

Cercospora brunkii Ell. & Gall., Leaf Spot. Hinds and Lauderdale.

PENSTEMON

P. AUSTRALIS Small., Beardtongue.

Puccinia andropogonis Schw., Rust. Oktibbeha.

Septoria pentastemonis Ell. & Ev., Leaf Spot. Oktibbeha.

P. DIGITALIS Nutt., Foxglove Beardtongue.

Septoria pentastemonis Ell. & Ev., Leaf Spot. Hinds.

P. TUBIFLORUS Nutt., Funnel-form Beardtongue

Puccinia andropogonis Schw., Rust. Oktibbeha.

PERSEA

P. BORBONIA (L.) Spreng., Redbay or Sweetbay.

Asterina delitescens Ell. & Martin. Jackson.

Coccoidella scutula (Berk. & Curt.) V. Hoehn. Harrison.

Meliola martiniana Gaill., Sooty Mold. George.

Phyllosticta micropuncta Cke., Leaf Spot. Adams and Jackson.

P. PUBESCENS (Pursh) Sarg., Swamp Bay.

Asterina delitescens Ell. & Martin. Forrest.

Cercospora purpurea Cke., Leaf Spot. Harrison and Lincoln.

Meliola amphitricha Fr., Sooty Mold. Stone.

Meliola martiniana Gaill., Sooty Mold. Lincoln.

PHASEOLUS

P. LUNATUS L., Lima Bean.

Cercospora canescens Ell. & Mart., Leaf Spot. Madison, Oktibbeha, and Pontotoc.

Colletotrichum lindemuthianum (Sacc. & Magn.) Briosi & Cav., Anthracnose. Copiah.

Colletotrichum truncatum (Schw.) Andrus & Moore, Anthracnose. Hinds and Oktibbeha.

Diaporthe phaseolorum (Cke. & Ell.) Sacc., Pod Blight. Clarke and Pearl River.

Heterodera marioni (Cornu) Goodey, Root-knot. Attala, Harrison, Holmes, Humphreys, Issaquena, Lauderdale, Leake, Leflore, Sharkey, Sunflower, Tate, and Washington.

Nematospora phaseoli Wingard, Yeast Spot. Holmes.

Sclerotium rolfsii Sacc., Southern Blight.

Uromyces phaseoli typica Arth., Rust. Yazoo.

P. VULGARIS L., Bean.

Cercospora cruenta Sacc., Leaf Spot. Copiah.

Colletotrichum lindemuthianum (Sacc. & Magn.) Briosi & Cav., Anthracnose. Amite.

PHASEOLUS--cont.
P. VULGARIS--cont.
Corticium vagum Berk. & Curt., Stem Rot. Lauderdale, Panola, and Scott.
Erysiphe polygoni DC., Powdery Mildew.
Heterodera marioni (Cornu) Goodey, Root-knot. Attala, Holmes, Humprheys, Jackson, Kemper, Lauderdale, Leake, Lowndes, Monroe, Neshoba, Newton, Washington, and Wayne.
Isariopsis griseola Sacc., Angular Leaf Spot. Amite.
Macrophomina phaseoli (Maubl.) Ashby, Ashy Stem Blight. Rankin.
Phyllosticta phaseolina Sacc., Leaf Spot. Oktibbeha.
Pseudomonas medicaginis var. phaseolicola (Burkh.) Stapp & Kotte, Halo Blight.
Pythium sp., Stem Tip Blight.
Rhizoctonia microsclerotia Matz., Leaf Blight.
Rhizoctonia solani Kuehn, Stem Canker.
Sclerotium rolfsii Sacc., Southern Blight. Jones and Washington.
Uromyces appendiculatus Fr., Rust.
Uromyces phaseoli typica Arth., Rust. Calhoun, Holmes, Jackson, Lauderdale, Pearl River, and Warren.
Virus, Mosaic.
Xanthomonas phaseoli (E. F. Sm.) Dowson, Bacterial Blight. Oktibbeha.

P. SP., Snap Bean.
Uromyces phaseoli typica Arth., Rust. Hinds, Jackson, and Rankin.

P. SP., Bean.
Amerosporium oeconomicum Ell. & Tracy, Leaf Spot. Harrison.
Cercospora cruenta Sacc., Leaf Spot. Harrison.
Diaporthe phaseolorum (Cke. & Ell.) Sacc., Pod Blight. Jackson.

PHLEUM
P. PRATENSE L., Timothy.
Ustilago striaeformis (West.) Niessl, Smut. Rankin.

PHLOX
P. PANICULATA L., Garden Phlox.
Erysiphe cichoracearum DC., Powdery Mildew. Tippah and Winston.

P. SP.
Cercospora phlogina Pk., Leaf Spot. Bolivar and Coahoma.
Septoria divaricatae Ell. & Ev., Leaf Spot. Prentiss.
Vermicularia phlogina Fairman. Coahoma.

PHOENIX
P. CANARIENSIS Chaub., Canary Date Palm.
Exosporium palmivorum Sacc., Leaf Spot. Claiborne.
Pestalozzia palmicola Sacc. & Syd., Leaf Spot. Jefferson Davis.

PHOENIX--cont.

P. DACTYLIFERA L., Date Palm.
Exosporium palmivorum Sacc., Leaf Spot. Harrison.
Graphiola phoenicis (Moug.) Poit., False Smut. Harrison, Jackson, Leake, and Pike.

P. SP.
Exosporium palmivorum Sacc., Leaf Spot. Harrison.

PHRYMA

P. LEPTOSTACHYA L., American Lopseed.
Septoria leptostachyae Ell. & Kell., Leaf Spot. Perry.

PHYLLOSTACHYS

P. SP., Bamboo.
Ustilago shiraiana Hem., Smut. Sharkey.

PHYSALIS

P. LANCEOLATA Michx., Prairie Groundcherry.
Aecidium physalidis Burr., Rust. DeSoto.

P. VIRGINIANA Mill., Virginia Groundcherry.
Entyloma physalidis (Klebh. & Cke.) Wint. Yalobusha.

PINUS

P. CARIBAEA Morelet, Slash Pine.
Coleosporium vernoniae Berk. & Curt., Rust. Harrison.
Cronartium quercuum (Berk.) Miy., Rust. Oktibbeha.
Hypoderma lethale Dearn. Hancock.

P. ECHINATA Mill., Yellow or Shortleaf Pine.
Coleosporium solidaginis (Schw.) Thuem., Rust. Lauderdale.
Hypoderma hedgcockii Dearn., Chickasaw.
Hypoderma lethale Dearn. Marshall.

P. PALUSTRIS Mill., Longleaf Pine.
Coleosporium delicatulum (Arth. & Kerr) Hedgc. & Long, Rust. Harrison and Hinds.
Coleosporium elephantopodis (Schw.) Thuem., Rust. George.
Coleosporium ipomoeae (Schw.) Burr., Rust. George and Oktibbeha.
Coleosporium vernoniae Berk. & Curt., Rust. Lamar and Oktibbeha.
Cryptosporium acicola Thuem. Harrison.
Lophodermium australe Dearn. Harrison.
Stilbospora pinnicola Berk. & Curt. Simpson.

P. TAEDA L., Loblolly Pine.
Coleosporium solidaginis (Schw.) Thuem., Rust. Oktibbeha.
Cronartium quercuum (Berk.) Miy., Rust. Oktibbeha.
Lophodermium australe Dearn. Scott.

PINUS--cont.
P. TAEDA--cont.
Peridermium cerebrum Pk., Rust. Oktibbeha.
Scolecodothis pinicola Miles. Oktibbeha.
Systremma acicola (Dearn.) Wolf & Barbour, Brown Spot.

P. VIRGINIANA Mill., Scrub Pine.
Hypoderma hedgcockii Dearn. Union.

P. SP.
Polyporus schweinitzii Fr., Root Rot. Wilkinson.

PISUM
P. SATIVUM L., Garden Pea.
Ascochyta pinodella Jones, Leaf and Stem Spot.
Ascochyta pisi Lib., Blight. Claiborne, Stone, and Yazoo.
Erysiphe polygoni DC., Powdery Mildew. Adams, Amite, Forrest, George, Jackson, Sunflower, and Yazoo.
Peronospora viciae (Berk.) DBy., Downy Mildew. Copiah.
Rhizoctonia sp., Stem Canker.
Septoria pisi Westd., Leaf Spot.

P. SATIVUM var. ARVENSE Poir., Austrian Winter Pea.
Pseudomonas pisi Sackett, Bacterial Blight. Attala and Winston.

P. SP., Pea.
Heterodera marioni (Cornu) Goodey, Root-knot. Holmes, Jasper, Leake, Leflore, Neshoba, Sunflower, and Tippah.

PITTOSPORUM
P. SP.
Cercospora sedoides Ell. & Ev., Leaf Spot. Leflore.
Cercospora sp., Leaf Spot. Leflore.
Phyllosticta sp., Leaf Spot. Hinds.

PLANTAGO
P. MAJOR L., Rippleseed Plantain.
Erysiphe cichoracearum DC., Powdery Mildew. Webster.
Peronospora alta Fckl., Downy Mildew. Lafayette.
Ramularia plantaginis Ell. & Martin, Leaf Spot. Yazoo.

PLATANUS
P. OCCIDENTALIS L., Sycamore.
Diatrypella prominens Howe. Marshall.
Eutypella platani (Schw.) Sacc. Clay.
Exosporium platani Otth., Leaf Spot. Oktibbeha.
Gloeosporium nervisequum (Fckl.) Sacc., Leaf Spot. Oktibbeha.
Gnomonia veneta (Sacc. & Speg.) Kleb., Anthracnose. Smith and Clarke.

POA

P. PRATENSIS L., Kentucky Bluegrass.
Erysiphe graminis DC., Powdery Mildew. Oktibbeha.

P. SP.
Phyllachora graminis (Pers. ex Fr.) Fckl., Black Spot. Jackson.

PODOPHYLLUM

P. PELTATUM L., Common Mayapple.
Macrosporium podophylli Ell. & Ev., Leaf Spot. Oktibbeha.
Phyllosticta podophylli (Curt.) Wint., Leaf Spot. Oktibbeha.
Puccinia podophylli Schw., Rust. Lafayette and Wilkinson.
Septoria podophyllina Pk., Leaf Spot. Bolivar, Oktibbeha, and Winston.

POLYGALA

P. LUTEA L., Yellow Milkwort.
Cercospora grisea Cke. & Ell., Leaf Spot. Stone.
Cercospora minuta Cke. & Ell., Leaf Spot. Stone.

POLYGONUM

P. ACRE H.B.K., Smartweed.
Puccinia polygoni-amphibii Pers., Rust. Harrison.
Ustilago utriculosa (Nees) Tul., Smut. Sharkey.

P. CILINODE Michx., Blackfringe Bindweed.
Ustilago anomala J. Kunze, Smut. Washington.

P. CRISTATUM (Engelm. & Gray) Small, Crested False Buckwheat.
Puccinia polygoni-amphibii Pers., Rust. Jackson.

P. ERECTUM L., Erect Knotweed.
Erysiphe cichoracearum DC., Powdery Mildew. Oktibbeha.
Uromyces polygoni (P.) Fckl., Rust. Clay.

P. HYDROPIPER L., Marshpepper Smartweed.
Septoria polygonorum Desm., Leaf Spot. Tallahatchie.
Sphacelotheca hydropiperis (Schum) DBy., Smut. Leflore.

P. HYDROPIPEROIDES Michx., Swamp Smartweed.
Ustilago utriculosa (Nees) Tul., Smut. Holmes.

P. LAPATHIFOLIUM L., Curltop Ladysthumb.
Ustilago utriculosa (Nees) Tul., Smut. Attala and Sharkey.

P. PENSYLVANICUM L., Pennsylvania Smartweed.
Puccinia polygoni-amphibii Pers., Rust. Harrison.
Septoria polygonorum Desm., Leaf Spot. Oktibbeha.
Ustilago utriculosa (Nees) Tul., Smut. Rankin and Winston.

P. PERSICARIA L., Spotted Ladysthumb.
Puccinia polygoni-amphibii Pers., Rust. Stone.
Septoria polygonorum Desm., Leaf Spot. Stone.

POLYGONUM--cont.

P. SCANDENS L., Climbing False Buckwheat.
Puccinia polygoni-amphibii Pers., Rust. Lafayette.

P. SP., Knotweed.
Uromyces polygoni (P.) Fckl., Rust. Clay.

P. SP.
Septoria polygonorum Desm., Leaf Spot. Carroll.

PONCIRUS

P. TRIFOLIATA, Trifoliate Orange.
Colletotrichum gloeosporioides Penz., Wither Tip. Jackson.

POPULUS

P. DELTOIDES Marsh., Eastern Poplar, Cottonwood.
Cylindrosporium oculatum Ell. & Ev., Leaf Spot. Wayne.
Melampsora medusae Thuem., Rust. Choctaw, Clay, and Oktibbeha.
Uredo medusae Arth., Rust. Choctaw.

P. NIGRA L., Black Poplar.
Marssonia rhabdospora Ell. & Ev., Leaf Spot. Franklin, Panola, and Rankin.

P. TREMULOIDES Michx., American Aspen.
Marssonia populi (Lib.) Sacc., Leaf Spot. Hancock.
Uncinula salicis (DC.) Wint., Powdery Mildew. Jasper.

P. SP.
Cytospora nivea Sacc. Harrison.
Melampsora sp., Rust. Washington.

PORTULACA

P. OLERACEA L., Common Purslane.
Cystopus portulacae (DC.) Lév. Leake.

POTENTILLA

P. CANADENSIS L., Common Cinquefoil.
Frommea obtusa (Str.) Arth. Lafayette and Oktibbeha.
Taphrina potentillae (Farl.) Johans. Pontotoc.

P. MONSPELIENSIS L., Rough Cinquefoil.
Mollisia dehnii (Rabh.) Karst. Oktibbeha.

PRENANTHES

P. ALBA L., White Rattlesnake-Root.
Septoria nabali Berk. & Curt. Oktibbeha.

PRUNELLA

P. VULGARIS L., Common Selfheal.
Septoria brunellae Ell. & Holw., Leaf Spot. Jefferson Davis.
Sphaerotheca castagnei Lév., Powdery Mildew. Oktibbeha.

PRUNUS

P. AMERICANA Marsh., American Plum.
Dibotryon morbosum (Schw.) Theiss. & Syd., Black Knot. Grenada and Oktibbeha.
Septobasidium retiforme (Berk. & Curt.) Pat., Canker. Oktibbeha.
Taphrina mirabilis (Atk.) Gies. Hinds, Jones, and Oktibbeha.
Taphrina pruni (Fckl.) Tul., Plum Pockets. Bolivar and Sunflower.
Tranzschelia pruni-spinosae (Pers.) Diet., Rust. Holmes.

P. ANGUSTIFOLIA Marsh., Chickasaw Plum.
Dibotryon morbosum (Schw.) Theiss. & Syd., Black Knot. Holmes.
Puccinia pruni-spinosae Pers., Rust. Oktibbeha.
Taphrina mirabilis (Atk.) Gies. Attala and Lauderdale.

P. ANGUSTIFOLIA WATSONI, Sand Chickasaw Plum.
Cercospora circumscissa Sacc., Shot-hole. Harrison.

P. CERASUS L., Sour Cherry.
Coccomyces hiemalis Higg., Leaf Spot, Shot-hole. Marion and Marshall.
Phyllosticta prunicola Sacc., Leaf Spot. Grenada.
Podosphaera oxyacanthae (DC.) DBy., Powdery Mildew. Greene.
Puccinia pruni-spinosae Pers., Rust. Lauderdale and Oktibbeha.
Tranzschelia pruni-spinosae (Pers.) Diet., Rust. Lauderdale.

P. DEMISSA (Nutt.) Walp., Chokecherry.
Diplodina pruni Ell. & Barth. Pearl River.

P. DOMESTICA L., Garden Plum.
Cercospora cerasella Sacc., Leaf Spot. Harrison and Oktibbeha.
Coccomyces hiemalis Higg., Leaf Spot, Shot-hole. Newton.
Dibotryon morbosum (Schw.) Theiss. & Syd., Black Knot. Jackson.

P. LAUROCERASUS L., Common Laurelcherry.
Coccomyces lutescens Higg., Leaf Spot. Coahoma.
Cylindrosporium padi Karst., Leaf Spot. Coahoma.
Xanthomonas pruni (E. F. Sm.) Dowson, Black Spot. Yazoo.

P. PERSICA (L.) Batsch, Peach.
Agrobacterium tumefaciens (E. F. Sm. & Town.) Conn, Crown Gall. Holmes.
Cercospora circumscissa Sacc., Shot-hole. Harrison.
Cercospora persicae Sacc., Leaf Spot. Marion.
Cercosporella persicae Sacc., Frosty Mildew. Marion, Marshall, and Pontotoc.
Cladosporium carpophilum Thuem., Scab. Clarke and Sunflower.
Coryneum beyerinckii Oud., Blight. Lauderdale and Smith.
Heterodera marioni (Cornu) Goodey, Root-knot. Chickasaw, Jones, Lauderdale, Leflore, Lincoln, Monroe, Pike, Union, and Wayne.
Phytomonas pruni (E. F. Smith) Berget et al., Shot Hole.

PRUNUS--cont.

P. PERSICA--cont.

Pseudomonas pruni E. F. Sm., Bacterial Spot. Forrest.

Puccinia pruni-spinosae Pers., Rust. Harrison, Newton, and Oktibbeha.

Sclerotinia fructicola (Wint.) Rehm., Brown Rot.

Septobasidium pseudopedicellatum Burt, Girdle and Canker. George.

Taphrina deformans (Fcl.) Tul., Leaf Curl. Alcorn, Bolivar. Marshall, Monroe, Pontotoc, Prentiss, and Tishomingo.

Tranzschelia pruni-spinosae (Pers.) Diet., Rust.

Tranzschelia punctata Arth., Rust. Coahoma and Marion.

Valsa leucostoma (Pers.) Fr., Die-back. Lincoln and Sunflower.

Xanthomonas pruni (E. F. Sm.) Dowson, Black Spot. Lincoln and Washington.

P. SEROTINA Ehrh., Black Cherry.

Cylindrosporium lutescens Higg., Leaf Spot. Oktibbeha.

Cylindrosporium padi Karst., Leaf Spot. Leake.

Dibotryon morbosum (Schw.) Theiss. & Syd., Black Knot. Oktibbeha.

Leptothyrium cinctum Cke. Stone.

Phyllosticta serotina Cke., Leaf Spot. Harrison, Newton, Oktibbeha, and Tate.

Sclerotinia fructicola (Wint.) Rehm., Brown Rot. Sunflower.

Taphrina deformans (Fcl.) Tul., Leaf Curl. Newton.

P. SIMONII Carr., Apricot Plum.

Puccinia pruni-spinosae Pers., Rust. Bolivar.

P. SPINOSA L., Blackthorn.

Puccinia pruni-spinosae Pers., Rust. Lauderdale.

P. SP., Apricot.

Tranzschelia pruni-spinosae (Pers.) Diet., Rust. Jones.

P. SP., Cherry.

Cylindrosporium padi Karst., Leaf Spot. Marshall and Noxubee.

Podosphaera oxyacanthae (DC.) DBy., Powdery Mildew. Marion.

Puccinia pruni-spinosae Pers., Rust. Sunflower.

P. SP., Plum.

Dibotryon morbosum (Schw.) Theiss. & Syd., Black Knot. Leake.

Puccinia pruni-spinosae Pers., Rust. Hinds.

Sclerotinia fructicola (Wint.) Rehm., Brown Rot.

Septobasidium retiforme (Berk. & Curt.) Pat., Canker. Jackson.

Tranzschelia pruni-spinosae (Pers.) Diet., Rust.

Xanthomonas pruni (E. F. Sm.) Dowson, Black Spot. Pearl River.

P. SP., Green Gage Plum

Coccomyces prunophorae Higg., Shot-hole, Leaf Spot. Marion and Oktibbeha.

PRUNUS--cont.

P. SP., Japanese Plum.

Dibotryon morbosum (Schw.) Theiss. & Syd., Black Knot. Lawrence and Lee.

P. SP., Wild Cherry.

Coccomyces hiemalis Higg., Leaf Spot, Shot-hole. Hinds.

P. SP.

Coccomyces hiemalis Higg., Leaf Spot, Shot-hole. Calhoun and Itawamba.

Taphrina pruni (Fckl.) Tul., Plum Pockets. Attala.

Taphrina sp., Oktibbeha.

PTERIDIUM

P. AQUILINUM (L.) Kuhn., Bracken.

Cryptomyces pteridis (Reb. ex Fr.) Rehm. Copiah and Forrest.

Uredinopsis macrosperma (Cke.) Magn., Rust. Jackson.

PTERIS

P. CRETICA L., Fern.

Phyllosticta pteridis Halst., Leaf Spot.

P. SP.

Uredo pteridis Diet. & Holw., Rust. Jackson.

PUERARIA

P. THUNBERGIANA (Sieb. & Zucc.) Benth., Kudzu

Bacterium puerariae Hedges, Halo Blight. State-wide.

Cercospora puerariicola Yamamoto. Carroll, Marshall, Newton, and Union.

Heterodera marioni (Cornu) Goodey, Root-knot. Kemper and Lauderdale.

Pseudomonas medicaginis var. phaseolicola (Burkh.) Stapp & Kotte, Halo Blight.

Rhizoctonia microsclerotia Matz, Leaf Blight.

PUNICA

P. SP., Pomegranate.

Heterodera marioni (Cornu) Goodey, Root-knot. Yazoo.

PYRRHOPAPPUS

P. CAROLINIANUS (Walt.) DC., Leafystem False Dandelion.

Puccinia hieracii (Schum.) Mart., Rust. Hinds, Stone, and Washington.

Puccinia pyrrhopappi Syd., Rust. Washington.

PYRUS

P. COMMUNIS L., Common Pear.

Armillaria mellea Vahl. ex Fries, Root Rot.

PYRUS--cont.

P. COMMUNIS--cont.

Bacillus amylovorus (Burr.) DeT., Fire Blight. Benton, Harrison, and Pearl River.
Cercospora minima Tracy & Earle, Leaf Spot.
Corticium salmonicolor Berk. & Br., Twig Blight.
Entomosporium maculatum Lév., Leaf Blight.
Fabraea maculata (Lév.) Atk., Leaf Blight. Hinds.
Gloeosporium perennans Zeller & Childs, Perennial Canker. Oktibbeha.
Heterodera marioni (Cornu) Goodey, Root-knot.
Phyllosticta pyrorum Cke., Leaf Spot. Pearl River.
Septobasidium retiforme (Berk. & Curt.) Pat., Canker. Pike.
Septoria piricola Desm., Leaf Spot. Lauderdale.

P. SINENSIS Lindl., Sand Pear.

Corticium stevensii Burt, Leaf Blight. Harrison.
Fabraea maculata (Lév.) Atk., Leaf Blight. George and Harrison.
Mycosphaerella sentina (Fr.) Schroet., Leaf Spot. Harrison, Jackson, Lee, and Pearl River.
Physalospora cydoniae Arnaud., Black Rot, Canker, Leaf Spot. Hancock, Harrison, Lawrence, and Webster.
Septobasidium retiforme (Berk. & Curt.) Pat., Canker. Forrest, George, Greene, Harrison, and Jackson.
Septoria piricola Desm., Leaf Spot. Harrison.

P. SP.

Fabraea maculata (Lév.) Atk., Leaf Blight. Amite.

QUAMOCLIT

Q. PENNATA, Cypressvine.

Coleosporium ipomoeae (Schw.) Burr., Rust. Coahoma and Oktibbeha.

QUERCUS

Q. ALBA L., White Oak.

Diaporthe leiphaemia (Fr.) Sacc. Covington.
Gloeosporium canadense Ell. & Ev., Leaf Spot. Scott.
Marssonia martini Sacc. & Ell., Leaf Spot. Lafayette.
Microsphaera quercina (Schw.) Burr., Powdery Mildew. Oktibbeha.

Q. CINEREA Michx., Bluejack Oak.

Meliola manca Ell. & Martin, Sooty Mold. Jackson.

Q. COCCINEA Muench., Scarlet Oak.

Microsphaera alni (DC.) Wint., Powdery Mildew. Lawrence.

Q. FALCATA Michx., Spanish Oak.

Leptothyrium dryinum Sacc., Leaf Spot. Perry.

QUERCUS--cont.

Q. LAURIFOLIA Michx., Laurel Oak.
Trabutia quercina (Rud.) Sacc. & Roum. Jackson.

Q. MACROCARPA Michx., Bur Oak.
Ceratophorum uncinatum (Clint.) Sacc. Clarke.
Marssonia martini Sacc. & Ell., Leaf Spot. Pearl River.

Q. MARILANDICA Muench., Blackjack Oak.
Cronartium quercuum (Berk.) Miy., Rust. Lafayette.
Marssonia martini Sacc. & Ell., Leaf Spot. Oktibbeha.
Taphrina coerulescens (Desm. & Mont.) Tul., Leaf Curl, Leaf Blister. Oktibbeha.

Q. MUHLENBERGII Engelm., Yellow Oak.
Marssonia quercus Pk., Leaf Spot. Clarke.

Q. MYRTIFOLIA Willd., Myrtle Oak.
Trabutia quercina (Rud.) Sacc. & Roum. Cat Island.

Q. NIGRA L., Water Oak.
Taphrina coerulescens (Desm. & Mont.) Tul., Leaf Curl, Leaf Blister. Copiah, George, Harrison, and Jackson.
Trabutia quercina (Rud.) Sacc. & Roum. Harrison.

Q. PRINOIDES Willd., Dwarf Chestnut Oak.
Marssonia martini Sacc. & Ell., Leaf Spot. Oktibbeha.
Microsphaera quercina (Schw.) Burr., Powdery Mildew. DeSoto.

Q. PRINUS L., Rock Chestnut Oak.
Marssonia martini Sacc. & Ell., Leaf Spot. Wayne.

Q. RUBRA L., Red Oak.
Gloeosporium nervisequum (Fckl.) Sacc., Leaf Spot. Union.

Q. STELLATA Wang., Post Oak.
Leptothyrium dryinum Sacc., Leaf Spot. George.
Phyllactinia corylea (Pers.) Karst., Powdery Mildew. Oktibbeha.

Q. VELUTINA Lam., Black Oak.
Microsphaera densissima (Schw.) Cke. & Pk., Powdery Mildew. Oktibbeha.
Valsa lutescens Ell. Benton.

Q. VIRGINIANA Mill., Live Oak.
Cronartium quercuum (Berk.) Miy., Rust. Harrison.
Meliola manca Ell. & Martin, Sooty Mold. Jackson.
Polyporus gilvus Fr. Harrison.
Trabutia quercina (Rud.) Sacc. & Roum. Harrison and Jackson.

Q. SP., Turkey Oak.
Taphrina sp. Noxubee

QUERCUS--cont.
Q. SP.
Ascomycetella quercina Pk. Simpson.
Coccomyces dentatus (Schw. ex Fr.) Sacc., Leaf Spot. Choctaw.
Diatrype albopruinosa (Schw.) Cke. & Ell. Madison.
Hypoderma ilicinum DeN. Winston.
Hypoxylon annulatum (Schw.) Mont. Jasper and Scott.
Hypoxylon atropunctatum (Schw. ex Fr.) Cke. Adams.
Hypoxylon malleolus Berk. & Rav. Oktibbeha.
Hypoxylon punctulatum Berk. & Rav. Madison.
Marssonia martini Sacc. & Ell., Leaf Spot. Oktibbeha.
Monochaetia desmazierii Sacc., Leaf Spot. Leake.
Nummularia punctulata (Berk. & Rav.) Sacc., Canker. Monroe.
Polyporus cinnabarinus (Jacq.) Fr. Newton.
Polyporus fumosus (Pers.) Fr. Pike.
Polyporus hirsutus (Wulf.) Fr. Holmes.
Poria rufa Schrad. var. *lilacina* Rab. Coahoma.
Septobasidium pedicillatum (Schw.) Pat., Canker. Simpson.
Septobasidium retiforme (Berk. & Curt.) Pat., Canker. Jones.
Septoria neglecta Earle, Leaf Spot. Jackson.
Taphrina coerulescens (Desm. & Mont.) Tul., Leaf Curl, Leaf Blister. Harrison, Jackson, and Pearl River.
Xylaria hypoxylon (L.) Grev. Adams.

RANUNCULUS
R. ABORTIVUS L., Littleleaf Buttercup.
Dicaeoma eatoniae Arth., Rust. Oktibbeha.
Erysiphe communis (Wallr.) Fr., Powdery Mildew. Oktibbeha.
Puccinia eatoniae Arth., Rust. George and Oktibbeha.

R. SEPTENTRIONALIS Poir., Swamp Buttercup.
Didymaria ungeri Sacc., Leaf Spot. Oktibbeha.
Ramularia ranunculi Pk., Leaf Spot. Calhoun.

RAPHANUS
R. SATIVUS L., Garden Radish.
Peronospora parasitica (Pers.) DBy., Downy Mildew. Jackson.

R. SP., Radish.
Heterodera marioni (Cornu) Goodey, Root-knot. Attala.

RESEDA
R. ODORATA L., Common Mignonette.
Cercospora resedae Fckl., Leaf Spot. Greene and Marion.

RHEUM
R. RHAPONTICUM L., Garden Rhubarb.
Phyllosticta rhei Ell. & Ev., Leaf Spot. Stone.

RHEXIA
R. MARIANA L., Maryland Meadowbeauty.
Cercospora erythrogena Atk., Leaf Spot. Harrison.

RHODODENDRON
R. INDICUM Sweet., Indica Azalea.
Exobasidium azaleae Pk., Leaf Gall. Pike.

R. VISCOSUM (L.) Torr., Swamp Azalea.
Exobasidium vaccinii (Fckl.) Wor., Leaf Gall. Perry.
Ramularia angustata Pk., Leaf Spot. Perry.

R. SP., Azalea.
Colletotrichum sp., Anthracnose. Copiah.
Exobasidium azaleae Pk., Leaf Gall. Adams, Lauderdale, Leflore, Marion, and Washington.
Exobasidium vaccinii (Fckl.) Wor., Leaf Gall. Copiah, George, and Wayne.

RHUS
R. COPALLINA L., Dwarf Black Sumac.
Taphrina purpurascens (Ell. & Ev.) Robinson. Yazoo.

R. GLABRA L., Smooth Sumac.
Cercospora rhoina Cke. & Ell., Leaf Spot. Harrison and Holmes.

R. TOXICODENDRON L., Poison-Ivy.
Cylindrosporium toxicodendri (Curt.) Ell. & Ev., Leaf Spot. Oktibbeha.
Discosia artocreas Tode ex Fr., Leaf Spot. Pearl River.
Phyllosticta rhoicola Ell. & Ev., Leaf Spot. George.
Phyllosticta toxica Ell. & Martin, Leaf Spot. George.
Pileolaria toxicodendri (Berk. & Rav.) Arth. Adams, Harrison, and Oktibbeha.
Podosporium rigidum Schw. Oktibbeha.

R. TYPHINA L., Staghorn Sumac.
Cladosporium nervale Ell. & Dearn., Leaf Mold. Forrest.
Septoria rhoina Berk. & Curt., Leaf Spot. Lincoln.

RHYNCHOSIA
R. ERECTA DC., Erect Rhynchosia.
Parodiella perisporioides (Berk. & Curt.) Speg., Black Spot. Jones and Rankin.
Phyllosticta rhynchosiae Miles, Leaf Spot. Marion.

RIBES
R. ODORATUM Wendl., Clove Currant.
Puccinia caricis (Schum.) Schroet., Rust. Hinds.

R. TRISTE Pall., American Red Currant.
Cercospora ribicola Ell. & Ev., Leaf Spot. Warren.

RIBES--cont.

R. VULGARE Lam., Red Garden Currant.
Septoria ribis Desm., Leaf Spot. Lawrence.

R. SP.
Dothidella ribesia (Pers.) Theiss. & Syd. Tippah.

ROBINIA

R. PSEUDOACACIA L., Black Locust.
Camarosporium robiniae (West) Sacc. Sunflower.
Melanconium viscosum Sebu., Canker. Copiah.

RORIPA

R. ARMORACIA (L.) A. Hitchc., Horseradish.
Ramularia armoraciae Fckl., Leaf Spot. Stone.

ROSA

R. CAROLINA L., Wild Rose.
Phragmidium speciosum (Fr.) Cke., Rust. Lafayette and Oktibbeha.

R. VIRGINIANA Mill., Virginia Rose.
Phragmidium speciosum (Fr.) Cke., Rust. Oktibbeha.

R. SP., Rose.
Cercospora rosicola Pass., Leaf Spot. Amite, Claiborne, Clarke, Coahoma, Copiah, George, Noxubee, Oktibbeha, and Yalobusha.
Cladosporium fuscum Lk., Leaf Spot. Lauderdale.
Coniothyrium fuckelii Sacc., Stem Canker. Leake, Scott, and Sharkey.
Coniothyrium wernsdorffiae Laub. Oktibbeha.
Diplocarpon rosae Wolf., Black Spot. Coahoma, Greene, Hancock, Lauderdale, Monroe, Neshoba, and Oktibbeha.
Heterodera marioni (Cornu) Goodey, Root-knot. Washington.
Pestalozzia suffocata Ell. & Ev., Leaf Spot. Simpson.

R. SP.
Diaporthe umbrina Jenk., Canker. Oktibbeha.
Gloeosporium rosae Halst., Twig Blight. Coahoma and Jones.
Sclerotinia sp., Blight. Holmes.
Sphaerotheca humuli (DC.) Burr., Powdery Mildew. Hinds and Coahoma.
Sphaerotheca pannosa (Wallr.) Lev., Powdery Mildew. Hinds, Jones, Madison, and Wilkinson.

RUBUS

R. ALLEGHENIENSIS Porter, Mountain Blackberry.
Plectodiscella veneta Burk., Anthracnose. Covington.

R. IDAEUS var. STRIGOSUS Maxim., Wild Red Raspberry.
Plectodiscella veneta Burk., Anthracnose. Lowndes.

RUBUS--cont.

R. OCCIDENTALIS L., Black Raspberry.
Cylindrosporium rubi Ell. & Morg., Leaf Spot. Tallahatchie.
Gymnoconia interstitialis Lagerh., Rust. Lauderdale.

R. PROCUMBENS Muhl., Dewberry.
Gloeosporium rubi Ell. & Ev., Anthracnose. Oktibbeha.
Gymnoconia interstitialis Lagerh., Rust. Harrison, Jackson, and Oktibbeha.
Gymnoconia peckiana (Howe) Trott., Rust. Harrison and Oktibbeha.
Kuehneola uredinis (Link.) Arth., Rust. Alcorn, Covington, and Oktibbeha.
Kunkelia nitens (Schw.) Arth., Rust. Oktibbeha.
Septoria rubi West., Leaf Spot. Oktibbeha.

R TRIVIALIS Michx., Low Bush Blackberry, Southern Dewberry.
Cercospora rubi Sacc., Blotch. Oktibbeha.
Kuehneola uredinis (Link.) Arth., Rust. Harrison.
Plectodiscella veneta Burk., Anthracnose. Webster.
Septoria rubi West., Leaf Spot. Oktibbeha.

R. SP., Blackberry.
Gymnoconia interstitialis Lagerh., Rust. Washington.
Gymnoconia peckiana (Howe) Trott., Rust. Oktibbeha.

R. SP., Boysenberry.
Agrobacterium tumefaciens (E. F. Sm. & Town.) Conn, Crown Gall. Oktibbeha.
Mycosphaerella rubi Roark, Leaf Spot. Chickasaw.

R. SP., Dewberry.
Cercospora rubi Sacc., Blotch. Hinds, Lee, and Oktibbeha.

R. SP., Raspberry.
Leptosphaeria coniothyrium (Fckl.) Sacc., Cane Blight. Noxubee.
Mycosphaerella rubi Roark, Leaf Spot. Monroe.
Phragmidium imitans Arth., Rust. Copiah.
Phragmidium rubi-idaei (Pers.) Wint., Rust. Copiah.

R. SP., Youngberry.
Fusarium rubi Wint., Double Blossom. Harrison and Hinds.
Leptosphaeria coniothyrium (Fckl.) Sacc., Cane Blight. Harrison, Noxubee, Oktibbeha, and Perry.

R. SP.
Kuehneola uredinis (Link.) Arth., Rust. Jackson.
Kunkelia nitens (Schw.) Arth., Rust. Copiah.
Plectodiscella veneta Burk., Anthracnose. Lafayette.

RUDBECKIA
R. LACINIATA L., Tall Coneflower.
Uromyces perigynius Hals., Rust. Oktibbeha.
Uromyces rudbeckiae Arth. & Holw., Rust. Oktibbeha.

R. TRILOBA L., Thinleaved Coneflower.
Septoria rubdbeckiae Ell. & Hals., Leaf Spot. Lafayette.

RUELLIA
R. STREPENS L., Limestone Ruellia
Puccinia lateripes Berk. & Rav., Rust. Harrison.
Puccinia ruelliae (Berk. & Br.) Lagerh., Rust. Harrison.

RUMEX
R. CRISPUS L., Curly Dock.
Ovularia obliqua (Cke.) Oud., Leaf Spot. Calhoun.
Ramularia occidentalis Ell. & Kell., Leaf Spot. Oktibbeha.

R. OBTUSIFOLIUS L., Bitter Dock.
Ramularia circumfusa Ell. & Ev., Leaf Spot. Newton.

RYNCHOSPORA
R. FASCICULARIS (Michx.) Vahl, Fasciculate Beaked Rush.
Uromyces rhynchosporae Ell., Rust. Hinds.

R. GLOMERATA (L.) Vahl, Clustered Beaked Rush.
Uromyces rhynchosporae Ell., Rust. Lowndes.

SABAL
S. MINOR Pers., Dwarf Palmetto.
Meliola amphitricha Fr., Sooty Mold. Pearl River.

S. PALMETTO Lodd., Cabbage Palmetto.
Meliola amphitricha Fr., Sooty Mold. Harrison.
Meliola palmicola Wint., Sooty Mold. Jackson.

SACCHARUM
S. OFFICINARUM L., Sugarcane.
Colletotrichum falcatum Went., Red Rot. Jackson.
Gloeocercospora sorghi Bain & Edgerton, Zonate Leaf Spot. Lauderdale and Pearl River.
Gnomonia iliau Edg., Stem Rot. Franklin and Yazoo.
Melanconium sacchari Mass., Rind Disease. Leake.
Sclerotium rolfsii Sacc., Southern Blight. Adams and Jackson.
Virus, Mosaic.

SAGITTARIA
S. LATIFOLIA Willd., Broadleaved Arrowhead.
Cercospora sagittariae Ell. & Kell., Leaf Spot. Tallahatchie.

SALIX

- S. CORDATA Muhl., Heartleaved Willow.
  - *Rhytisma salicinum* (P.) Fr., Tar Spot. Monroe.
- S. DISCOLOR Muhl., Pussywillow.
  - *Botryosphaeria ribis* Gross. & Dugg. var. *chromogena* Shear. Coahoma and Forrest.
  - *Cercospora salicina* Ell. & Ev., Leaf Spot. Leflore.
- S. INTERIOR Rowlee, Sandbar Willow.
  - *Melampsora abieti-caprearum* Tub., Rust. Jones.
  - *Melampsora americana* Arth., Rust. Jones.
- S. NIGRA Marsh., Black Willow.
  - *Darluca filum* (Biv.) Cast. (parasitic on *Melampsora bigelowii* Thuem.). Oktibbeha.
  - *Melampsora bigelowii* Thuem., Rust. Oktibbeha.
  - *Rhytisma salicinum* (P.) Fr., Tar Spot. Webster.
  - *Uredo bigelowii* Arth., Rust. Oktibbeha.
- S. SP., Willow.
  - *Heterodera marioni* (Cornu) Goodey, Root-knot. Lauderdale.
  - *Uncinula salicis* (DC.) Wint., Powdery Mildew. Oktibbeha.
- S. SP.
  - *Cercospora salicina* Ell. & Ev., Leaf Spot. Jones.
  - *Diatrypella pulcherrima* Ell. & Ev. Clarke.
  - *Discella carbonacea* (Fr.) Berk. & Br. Greene.
  - *Discula brenckleana* (Sacc. & Syd.) Petrak. Humphreys.
  - *Trimmatostroma americanum* Thuem. Benton.

SAMBUCUS

- S. CANADENSIS L., American Elder.
  - *Cercospora catenospora* Atk., Leaf Spot. Coahoma.
  - *Cercospora depazeoides* (Desm.) Sacc., Leaf Spot. Coahoma and Stone.
  - *Cytospora sambucina* Ell. & Bart.
  - *Gloeosporium tineum* Sacc., Leaf Spot. Jones.
  - *Haplosporella seriata* Ell. & Ev. Webster.
  - *Puccinia bolleyana* Sacc., Rust. Harrison and Madison.
  - *Ramularia sambucina* Sacc., Leaf Spot. Jackson.
- S. NIGRA L., European Elder.
  - *Cercospora catenospora* Atk., Leaf Spot. Pearl River.
  - *Cercospora depazeoides* (Desm.) Sacc., Leaf Spot. Pearl River.

SANICULA

- S. CANADENSIS L., Shortstyled Snakeroot.
  - *Synchytrium pluriannulatum* (Curt.) Farl. Oktibbeha.
- S. MARILANDICA L., Black Snakeroot.
  - *Synchytrium pluriannulatum* (Curt.) Farl. Oktibbeha.

SASSAFRAS

- S. ALBIDUM (Nutt.) Nees, Common Sassafras.
  - *Diplodia sassafras* Tracy & Earle. Noxubee and Oktibbeha.

SAURURUS
S. CERNUUS L., Common Lizardstail.
Cercospora _saururi_ Ell. & Ev., Leaf Spot. Rankin.

SCIRPUS
S. CYPERINUS (L.) Kunth., Woolgrass Bulrush.
Puccinia _angustata_ Pk., Rust. Kemper and Oktibbeha.

S. SP.
Hypoderma _scirpinum_ DC. Holmes.

SCLERIA
S. TRIGLOMERATA Michx., Tall Nutrush.
Phyllachora _scleriicola_ Miles, Leaf Spot. George.

SCROPHULARIA
S. MARILANDICA L., Maryland Figwort.
Septoria _scrophulariae_ Pk., Leaf Spot. Lee.

SCUTELLARIA
S. INCANA Muhl., Downy Skullcap.
Cercospora _scutellariae_ Ell. & Ev., Leaf Spot. Lafayette.

S. VERSICOLA Nutt., Heartleaved Skullcap.
Septoria _scutellariae_ Thuem., Leaf Spot. Hancock.

SEBASTIANA
S. LIGUSTRINA (Michx.) Muell. Arg., Sebastian Bush.
Uromyces _graminicola_ Burr., Rust. Stone.

SECALE
S. CEREALE L., Rye.
Colletotrichum _graminicolum_ (Ces.) G. W. Wils., Anthracnose. Oktibbeha.
Puccinia _rubigo-vera_ (DC.) Wint., Rust. Oktibbeha.

SETARIA
S. GLAUCA (L.) Beauv., Pigeongrass.
Ustilago _neglecta_ Niessl, Smut. Calhoun and Oktibbeha.

S. ITALICA (L.) Beauv., Foxtail Millet.
Piricularia _grisea_ (Cke.) Sacc. Adams.

S. SP.
Sclerospora _graminicola_ (Sacc.) Schr., Downy Mildew. Clay.

SICYOS
S. ANGULATUS L., Oneseeded Bur-Cucumber.
Peronospora _australis_ Speg., Downy Mildew.

SIDA
S. SPINOSA L., Prickly Sida.
Puccinia heterospora Berk. & Curt., Rust. Lincoln and Oktibbeha.

S. SP.
Heterodera marioni (Cornu) Goodey, Root-knot. George.

SILPHIUM
S. ASPERRIMUM Hook., Rosinweed.
Coleosporium terebinthinaceae (Schw.) Arth., Rust. Oktibbeha.

S. INTEGRIFOLIUM Michx., Entire-leaved Rosinwood.
Cercospora silphii Ell. & Ev., Leaf Spot. DeSoto.
Puccinia silphii Schw., Rust. Lafayette and Oktibbeha.

S. PERFOLIATUM L., Cup-plant.
Puccinia silphii Schw., Rust. Pearl River.

SIUM
S. CICUTAEFOLIUM Schrank., Water Parsnip.
Cercospora sii Ell. & Ev., Leaf Spot. Yazoo.

SMILACINA
S. RACEMOSA (L.) Desf., Feather Solomonplume.
Septoria smilacinae Ell. & Mart., Leaf Spot. Choctaw.

S. STELLATA Desf., Starry Solomonplume.
Phyllosticta convallariae P. ex Seaver, Leaf Spot. Greene.

SMILAX
S. GLAUCA Walt., Glaucous-leaved Greenbrier.
Cercospora mississippiensis Tracy & Earle, Leaf Spot. Coahoma.
Cercospora smilacis Thuem., Leaf Spot. Coahoma.
Puccinia smilacis Schw., Rust. Stone.

S. HISPIDA Muhl., Bristly Greenbrier.
Discosia smilacina DeN., Leaf Spot. Wayne

S. LAURIFOLIA L., Laurel-leaved Greenbrier.
Cercospora smilacis Thuem., Leaf Spot. DeSoto and Pearl River.
Pestalozzia funerea Desm., Leaf Spot. Amite.

S. SP.
Cercospora mississippiensis Tracy & Earle, Leaf Spot. Coahoma.
Cercospora smilacis Thuem., Leaf Spot. Hinds and Issaquena.
Coniothyrium fuckelii Sacc., Stem Canker. Oktibbeha.
Dicaeoma smilacis Ktze., Rust. Stone.
Puccinia smilacis Schw., Rust. Jackson and Oktibbeha.
Ramularia subrufa Ell. & Holw., Leaf Spot. Oktibbeha.

SOJA
S. MAX (L.) Piper, Soybean.
Bacterium sojae Wolf, Bacterial Blight.

SOJA--cont.

S. MAX--cont.

Cercospora cruenta Sacc., Leaf Spot. Oktibbeha.
Cercospora daizu Miura, Frog-eye. Itawamba, Lafayette, Pearl River, Scott, and Walthall.
Diaporthe sojae Lehman, Pod Blight.
Peronospora manshurica (Naoum.) Syd., (Peronospora sojae Lehman & Wolf) Downy Mildew. Attala.
Phytomonas tabaci (Wolf & Foster) Bergey et al., Wildfire.
Pseudomonas glycinea (Coerper) Stapp, Bacterial Blight. Jasper and Oktibbeha.
Sclerotium bataticola Taub., Southern Blight. Lincoln and Washington.
Sclerotium rolfsii Sacc., Southern Blight.
Septoria glycines Hemm., Leaf Spot. Lauderdale.
Virus, Mosaic. Oktibbeha.
Xanthomonas phaseoli var. sojense (Hed.) Starr & Burk. Bacterial Pustule. DeSoto and Quitman.

SOLANUM

S. MELONGENA L., Eggplant.

Cuscuta sp., Dodder, Love Vine. Marshall.
Heterodera marioni (Cornu) Goodey, Root-knot. Holmes, Issaquena, Leflore, Monroe, Sunflower, Tate, and Washington.
Phomopsis vexans (Sacc. & Syd.) Hart., Leaf Spot, Fruit Rot. Monroe.
Sclerotium rolfsii Sacc., Southern Blight.

S. TUBEROSUM L., Potato.

Alternaria solani (Ell. & Mart.) Jones & Grout, Early Blight. Clarke, Hinds, Oktibbeha, and Yazoo.
Cercospora concors (Casp.) Sacc., Leaf Blotch. Rankin.
Heterodera marioni (Cornu) Goodey, Root-knot. Attala, Copiah, Harrison, Holmes, and Marshall.
Phytophthora infestans (Mont.) DBy., Late Blight. Covington, Jackson, Marion, Oktibbeha, and Washington.
Sclerotium rolfsii Sacc., Southern Blight.
Virus, Rugose Mosaic.

SOLIDAGO

S. CANADENSIS L., Canada Goldenrod.

Coleosporium solidaginis (Schw.) Thuem., Rust. Lafayette and Marion.
Puccinia asteris Duby, Rust. Oktibbeha.
Puccinia asterum Kern, Rust. Oktibbeha.
Puccinia extensicola Plowr., Rust. Oktibbeha.

S. FISTULOSA Mill., Pine Barren Goldenrod.

Coleosporium solidaginis (Schw.) Thuem., Rust. George and Oktibbeha.

SOLIDAGO--cont.

S. SP.

Coleosporium solidaginis (Schw.) Thuem., Rust. George and Oktibbeha.

Dothidea solidaginis (Schw.) Fr. Attala.

Erysiphe cichoracearum DC., Powdery Mildew. Oktibbeha.

Uromyces solidaginis (Sommerf.) Niessl., Rust. Oktibbeha.

SORGHASTRUM

S. NUTANS (L.) Nash, Yellow Indiangrass.

Cerebella andropogonis Ces., False Smut. Sharkey.

Puccinia virgata Ell. & Ev., Rust. Harrison and Noxubee.

SORGHUM

S. HALEPENSE (L.) Pers., Johnson Grass.

Ascochyta sorghina Sacc. Oktibbeha.

Colletotrichum falcatum Went., Red Rot. Oktibbeha and Prentiss.

Puccinia purpurea Cke., Rust. Oktibbeha.

S. SACCHARATUM (L.) Moench, Sorgho.

Sphacelotheca sorghi (Link) Clint., Covered Kernel Smut. Oktibbeha.

S. VULGARE Pers., Sorghum.

Ascochyta sorghina Sacc., Leaf Spot.

Cercospora sorghi Ell. & Ev., Leaf Spot.

Colletotrichum graminicolum (Ces.) G. W. Wils., Anthracnose and Red Rot.

Gloeocercospora sorghi Bain & Edgerton, Zonate Leaf Spot. Lauderdale and Pearl River.

Phoma insidiosa F. Tassi. Marshall.

Pseudomonas andropogoni (E. F. Sm.) Stapp. Bacterial Stripe.

Puccinia purpurea Cke., Rust.

Sphacelotheca sorghi (Link.) Clint., Covered Kernel Smut. Lawrence, Oktibbeha, Pearl River, and Rankin.

Titaeospora andropogonis (Miura) Tai, Sooty Stripe.

S. VULGARE var. TECHNICUM (Koern.) Jav., Broom corn.

Colletotrichum lineola Cda., Anthracnose. Jasper.

S. SP.

Ascochyta sorghina Sacc. Oktibbeha.

SPARTINA

S. CYNOSUROIDES (L.) Roth., Salt Reedgrass.

Dicaeoma cephalanthi Jacks., Rust. Harrison.

Puccinia peridermiospora (Ell. & Tracy) Arth., Rust. Choctaw and Jackson.

Puccinia seymouriana Arth., Rust. Choctaw.

SPARTINA--cont.
S. MICHAUXIANA Hitchc., Tall Marshgrass.
Puccinia peridermiospora (Ell. & Tracy) Arth., Rust. Harrison.
Puccinia seymouriana Arth., Rust. Choctaw.

SPECULARIA
S. PERFOLIATA (L.) A. DC., Clasping Venus' Lookingglass.
Septoria speculariae Berk. & Curt., Leaf Spot. Madison, Lowndes, and Oktibbeha.

SPHENOPHOLIS
S. NITIDA (Spreng.) Scribn., Slender Eaton's-grass.
Puccinia eatoniae Arth., Rust. Oktibbeha.

S. OBTUSATA (Michx.) Scribn., Prairie Wedgescale.
Puccinia eatoniae Arth., Rust. Harrison.

S. SP.
Epichloe typhina (P. ex Fr.) Tul. Perry.

SPINACIA
S. OLERACEA L., Spinach.
Colletotrichum spinaciae Ell. & Halst., Anthracnose. Jones.

SPIRAEA
S. SP., Spirea
Heterodera marioni (Cornu) Goodey, Root-knot. Holmes and Lamar.

SPOROBOLUS
S. INDICUS (L.) R. Br., Smutgrass.
Helminthosporium ravenelii M. A. Curtis, Leaf Spot. Marion and Rankin.
Ophiodothis atramentosa (Berk. & Curt.) Earle. Jackson.

S. ASPER (Michx.) Kunth., Tall Dropseed.
Puccinia verbenicola Arth., Rust. Jackson.
Puccinia vilfae Arth. & Holw., Rust. Jackson.

STACHYS
S. PALUSTRIS L., Hedge Nettle.
Septoria stachydis Rob. & Desm., Leaf Spot. Lafayette.

STEIRONEMA
S. CILIATUM (L.) Raf., Fringed Loosestrife.
Septoria conspicua Ell. & Martin, Leaf Spot. Choctaw.

STELLARIA
S. MEDIA (L.) Cyrill., Chickweed.
Synchytrium stellariae Fckl. Oktibbeha.

STIZOLOBIUM
S. DEERINGIANUM Bort., Deering Velvetbean.
Cercospora stizolobii Syd., Leaf Spot. Lafayette and Harrison.

STROPHOSTYLES
S. HELVOLA (L.) Britton, Trailing Wildbean.
Uromyces phaseoli (Pers.) Wint., Rust. Jackson.
Uromyces phaseoli typica Arth., Rust. Jackson.

S. PAUCIFLORA (Benth.) S. Wats., Small Wildbean.
Uromyces phaseoli (Pers.) Wint., Rust. Jackson.

STYLOSANTHES
S. BIFLORA (L.) B.S.P., Pencilflower.
Phoma gramma (Schw.) Starb. Pearl River.

STYRAX
S. AMERICANA Lam., American Snowball.
Cercospora styracae Miles, Leaf Spot. Wayne.

SYMPHORICARPOS
S. RACEMOSUS Michx., Snowberry, Waxberry.
Microsphaera symphoricarpi Howe., Powdery Mildew. Hinds.

S. SP., Coralberry.
Microsphaera diffusa Cke. & Pk., Powdery Mildew. Pike.

SYMPLOCOS
S. TINCTORIA (L.) L'Her., Sweetleaf.
Exobasidium symploci Ell. & Martin, Leaf Gall. Jackson and Leflore.
Septoria symploci Ell. & Martin, Leaf Spot. Marion.

SYRINGA
S. PERSICA L., Persian Lilac.
Cercospora lilacis (Desm.) Sacc., Leaf Spot. Clarke, Coahoma, and Lafayette.

S. VULGARIS L., Common lilac.
Microsphaera alni (DC.) Wint., Powdery Mildew. Coahoma, Forrest, and Scott.
Sclerotium rolfsii Sacc., Southern Blight. Lowndes.

S. SP., Lilac.
Heterosporium syringae Oud. Neshoba.

TARAXACUM
T. OFFICINALE Weber, Common Dandelion.
Physarum cinereum (Batsch) Pers., Slime Mold. Oktibbeha.
Puccinia hieracii (Schum.) Mart., Rust. Lafayette and Webster.

TARAXACUM--cont.

T. OFFICINALE--cont.

Puccinia taraxaci Plowr., Rust. Jones and Lafayette.
Ramularia taraxaci Karst., Leaf Spot. Holmes and Oktibbeha.

TEPHROSIA

T. VIRGINICA (L.) Pers., Virginia Tephrosia.
Ravenelia eriphylla (Schw.) Diet., Rust. Tishomingo.

TEUCRIUM

T CANADENSE L., American Germander.
Cercospora racemosa Ell. & Martin, Leaf Spot. Hinds.
Cercospora teucrii Ell. & Kell., Leaf Spot. Wilkinson.

THALICTRUM

T. DIOICUM L., Early Meadowrue.
Polythelis thalictri Arth. Tishomingo.

THUJA

T. ORIENTALIS L., Oriental Arborvitae.
Cercospora thujina Plakidas, Thuja Blight. Jones, Lowndes, and Newton.

TILIA

T. AMERICANA L., American Linden, Basswood.
Cercospora microsora Sacc., Leaf Blight. Newton.
Exosporium tiliae Lk., Leaf Spot. Lowndes.
Uncinula clintonii Pk., Powdery Mildew. Bolivar.

TINIARIA

T. CONVOLVULUS (L.) Webb & Moq., Corn Bindweed.
Cercospora polygonacea Ell. & Ev., Leaf Spot. Rankin.

TOVARA

T. VIRGINIANA (L.) Raf., Virginia Knotweed.
Puccinia polygoni-amphibii Pers., Rust. Forrest.

TRIDENS

T. FLAVA (L.) Hitchc., Tall Red-Top.
Puccinia windsoriae Schw., Rust. Covington and Oktibbeha.

TRIFOLIUM

T. CAROLINIANUM Michx., Carolina Clover.
Uromyces elegans (Berk.) Lagh., Rust. Harrison.

T. DUBIUM, Hop Clover.
Erysiphe polygoni DC., Powdery Mildew.

TRIFOLIUM--cont.
T. INCARNATUM, Crimson Clover.
Cercospora zebrina Pass., Leaf Spot.
Polythrincium trifolii Kze., Sooty Mold.

T. PRATENSE L., Red Clover.
Erysiphe polygoni DC., Powdery Mildew. Adams and Panola.
Uromyces fallens (Desm.) Kern, Rust. Attala.
Uromyces trifolii (Hedw.) Lév., Rust. Rankin and Stone.

T. PROCUMBENS L., Low Hop Clover.
Erysiphe polygoni DC., Powdery Mildew. Oktibbeha.

T. REFLEXUM L., Buffalo Clover.
Polythrincium trifolii Kze. Oktibbeha.

T. REPENS L., White, Dutch, or Honeysuckle Clover.
Erysiphe polygoni DC., Powdery Mildew. Oktibbeha.
Polythrincium trifolii Kze. Tallahatchie.
Sclerotinia trifoliorum Eriks., Root Rot. Stone.

T. SP.
Helminthosporium sp., Leaf Spot. Lincoln.
Polythrincium trifolii Kze. Alcorn, George, Oktibbeha, and Stone.
Uromyces trifolii (Hedw.) Lév., Rust. Hinds.

TRILLIUM
T. RECURVATUM Berk., Prairie Trillium.
Septoria trillii Pk., Leaf Spot. Noxubee, Pontotoc, and Smith.

T. SP.
Septoria trillii Pk., Leaf Spot. Lee.

TRIPSACUM
T. DACTYLOIDES L., Eastern Gamagrass.
Puccinia tripsaci Diet. & Holw., Rust. Oktibbeha.

TRITICUM
T. AESTIVUM L., Wheat.
Colletotrichum graminicolum (Ces.) G. W. Wils., Anthracnose. DeSoto.
Fusarium culmorum (W. Sm.) Sacc., Seedling Blight. DeSoto.
Gibberella saubinetti (Mont.) Sacc., Fusarium Blight, Scab. Wayne.
Puccinia clematidis Lagh., Rust. Lauderdale and Oktibbeha.
Puccinia graminis Pers., Rust. DeSoto and Oktibbeha.
Puccinia triticina Erikss., Leaf Rust. DeSoto, Issaquena, and Sharkey.
Sclerotium rolfsii Sacc., Southern Blight. Oktibbeha.

TRITICUM--cont.
T. AESTIVUM--cont.
Septoria glumarum Pass., Speckled Leaf Blotch. Oktibbeha.
Septoria nodorum Berk., Speckled Leaf Blotch, Glume Blotch. Clay and DeSoto.
Septoria tritici Desm., Speckled Leaf Blotch, Glume Blotch. Lauderdale and Washington.
Tilletia levis Kuehn, Smut. Lauderdale.
Tilletia tritici (Bjerk.) Wint., Smut. Alcorn, Issaquena, Marshall, Monroe, and Simpson.
Ustilago tritici (Pers.) Rost., Loose Smut. Lauderdale, Marshall, and Prentiss.

TROPAEOLUM
T. MAJUS L., Common Nasturtium.
Pleospora tropaeoli Halst., Leaf Spot. Attala.

TYPHA
T. LATIFOLIA L., Common Cattail.
Hendersonia typhae Oud. Sunflower.

ULMUS
U. ALATA Michx., Winged Elm.
Cylindrosporium ulmicola Ell. & Ev. Hinds.
Phleospora ulmi (Fr.) Wallr. Oktibbeha.
Uncinula macrospora Pk., Powdery Mildew. Clarke and Oktibbeha.

U. AMERICANA L., American Elm.
Cylindrosporium ulmicola Ell. & Ev., Leaf Spot. Jackson.
Gloeosporium ulmicolum Miles, Leaf Spot. Holmes,
Gnomonia ulmea (Schw. ex Fr.) Thuem., Leaf Spot. Forrest, Lauderdale, Oktibbeha, and Tate.
Phleospora ulmi (Fr.) Wallr. Marion.
Schizophyllum commune Fr., Sap Rot. Oktibbeha.
Uncinula macrospora Pk., Powdery Mildew. Lauderdale and Tippah.

U. CRASSIFOLIA Nutt., Cedar Elm.
Gnomonia ulmea (Schw. ex Fr.) Thuem., Leaf Spot. Lauderdale.

U. FULVA Michx., Slippery Elm.
Ceratophorum ulmicolum Ell. & Kell. Coahoma.
Phleospora ulmi (Fr.) Wallr. Alcorn.
Phyllosticta melaleuca Ell. & Ev., Leaf Spot. Oktibbeha.
Phyllosticta ulmicola Sacc., Leaf Spot. Oktibbeha.

U. SP.
Ceratophorum ulmicolum Ell. & Kell. Scott.
Microsphaera alni (DC.) Wint., Powdery Mildew. Clay.

UNIOLA
U. LATIFOLIA Michx., Broadleaf Uniola.
Phoma glumarum Ell. & Tracy. Lowndes.

U. LAXA (L.) B.S.P., Slender Spikegrass.
Ustilago uniolae Ell. & Ev., Smut. Attala.

UVULARIA
U. SESSILIFOLIA L., Sessile-leaved Bellwort.
Puccinia majanthae Arth. & Holw., Rust. Oktibbeha.
Puccinia sessilis W. G. Schneid., Rust. Oktibbeha.

VACCINIUM
V. ARBOREUM Marsh., Farkleberry.
Phyllosticta vaccinii Earle, Leaf Spot. Wayne.
Rhytisma vaccinii (S.) Fr., Tar Spot. Forrest County; Ship Island.

V. CORYMBOSUM L., Highbush Blueberry.
Synchytrium vaccinii Thomas, Red Gall. Amite.

V. STAMINEUM L., Common Deerberry.
Pestalozzia gibbosa Hark., Leaf Spot. Jackson.
Phyllactinia suffulta (Reb.) Sacc., Powdery Mildew. Pearl River.

V. TENELLUM Ait., Small Black Blueberry.
Exobasidium vaccini (Fckl.) Wor., Leaf Gall. George and Wayne.
Rhytisma vaccinii (S.) Fr., Tar Spot. Marion.

V. VIRGATUM Ait., Southern Black Huckleberry.
Rhytisma vaccinii (S.) Fr., Tar Spot. DeSoto and Oktibbeha.

V. SP., Blueberry.
Rhytisma vaccinii (S.) Fr., Tar Spot. Pearl River.

VALERIANELLA
V. RADIATA (L.) Dufr., Beaked Cornsalad.
Septoria valerianellae Miles, Leaf Spot. Oktibbeha.
Synchytrium aureum Schroet. Oktibbeha.

VERATRUM
V. VIRIDE Ait., American White Hellebore.
Puccinia veratri (DC.) Duby., Rust. DeSoto.

VERBASCUM
V. BLATTARIA var. ALBIFLORUM, White Moth Mullein.
Septoria verbascicola Berk. & Curt., Leaf Spot. Oktibbeha.

V. THAPSUS L., Great Mullein.
Ramularia variabilis Fckl., Leaf Spot. Tunica.

VERBENA

V. HASTATA L., Blue Vervain.
Septoria verbenae Rob. & Desm., Leaf Spot. Humphreys.

V. STRICTA Vent., Wooly Verbena.
Erysiphe cichoracearum DC., Powdery Mildew. Calhoun.
Septoria verbenae Rob. & Desm., Leaf Spot. Oktibbeha.

V. SP.
Erysiphe cichoracearum DC., Powdery mildew. Coahoma, Humphreys, Lincoln, Pike, and Warren.

VERBESINA

V. VIRGINICA L., Small White Crownbeard.
Puccinia cognata Syd., Rust. Franklin.

VERNONIA

V. ALTISSIMA Nutt., Tall Ironweed.
Coleosporium vernoniae Berk. & Curt., Rust. Oktibbeha.

V. BALDWINI Torr., Baldwin Ironweed.
Cercospora vernoniae Ell. & Kell., Leaf Spot. Winston.
Coleosporium vernoniae Berk. & Curt., Rust. Lee.

V. FASCICULATA Michx., Western Ironweed.
Coleosporium vernoniae Berk. & Curt., Rust. Choctaw, Jones, and Oktibbeha.
Puccinia vernoniae Schw., Rust. Jones.

V. SP.
Coleosporium carneum Jacks., Rust. Oktibbeha.
Heterodera marioni (Cornu) Goodey, Root-knot. Stone.

VERONICA

V. PEREGRINA L., Purslane Speedwell.
Entyloma linariae Schroet. var. *veronicae* Wint., Leaf Smut. Wayne.

VIBURNUM

V. ACERIFOLIUM L., Mapleleaf Arrowwood.
Microsphaera alni (DC.) Wint., Powdery Mildew. Carroll.

V. CASSINOIDES L., Withe-rod, Viburnum.
Cercospora varia Pk., Leaf Spot. Coahoma.

V. OPULUS L., European Cranberrybush: High Bush Cranberry.
Cercospora opuli (Fckl.) v. Hoehn., Leaf Spot. Panola.
Cercospora varia Pk., Leaf Spot. Panola.

V. SP.
Heterodera marioni (Cornu) Goodey, Root-knot. Stone.

VICIA

- V. AMERICANA Muhl., Purple Vetch.
  - *Ascochyta pisi* Lib., Blight. Oktibbeha.
  - *Pucciniola porosa* (Pk.) Arth., Rust. Lee.
  - *Uromyces coloradensis* Ell. & Ev., Rust. Lee.

- V. ANGUSTIFOLIA L., Smaller Common Vetch.
  - *Ascochyta pisi* Lib., Blight. Oktibbeha.

- V. SATIVA L., Common Vetch.
  - *Ascochyta pisi* Lib., Blight. Oktibbeha and Pearl River.
  - *Peronospora viciae* (Berk.) DBy., Downy Mildew. George and Oktibbeha.

- V. VILLOSA Roth., Hairy Vetch.
  - *Ascochyta pisi* Lib., Blight. Madison.
  - *Ascochyta* sp., Leaf Spot.
  - *Colletotrichum viciae* Dearness & Overholts, Anthracnose.
  - *Erysiphe polygoni* DC., Powdery Mildew.
  - *Protocoronospora nigricans* Atk. & Edgerton emend. Wolf, False Anthracnose.

VIGNA

- V. SINENSIS (Torner) Savi, Common Cowpea.
  - *Amerosporium oeconomicum* Ell. & Tracy, Leaf Spot. Itawamba. Jefferson, Lauderdale, and Neshoba.
  - *Cercospora canescens* Ell. & Mart., Leaf Spot. Forrest and Hinds.
  - *Cercospora cruenta* Sacc., Leaf Spot. Calhoun, Oktibbeha, and Washington.
  - *Cercospora vignae* Ell. & Ev., Leaf Spot.
  - *Choanephora cucurbitarum* (Berk. & Rav.) Thax., Pod Rot.
  - *Cladosporium vignae* Gardner, Leaf Spot. George and Greene.
  - *Corticium vagum*, Berk. & Curt., Stem Rot. Jackson.
  - *Fusarium vasinfectum* var. *tracheiphilum* Erw. Sm., Wilt.
  - *Heterodera marioni* (Cornu) Goodey, Root-knot. Lauderdale, Newton, Oktibbeha, Pike, and Prentiss.
  - *Ramularia* sp., Frosty Mildew.
  - *Rhizoctonia microsclerotia* Matz, Leaf Blight.
  - *Sclerotium bataticola* Taub., Southern Blight. Marshall.
  - *Uromyces phaseoli vignae* (Barclay) Arth., Rust. George.
  - *Virus*, Mosaic.

- V. SP.
  - *Cercospora cruenta* Sacc., Leaf Spot. Forrest.

VINCETOXICUM

- V. PALUSTRE Gray, Winding Milkweed.
  - *Puccinia gonolobi* Rav., Rust. Harrison.
  - *Puccinia obliqua* Berk. & Curt., Rust. Harrison.

VIOLA

V. BLANDA Willd., Sweet White Violet.
Cercospora violae Sacc., Leaf Spot. Harrison.
Puccinia violae (Schum.) DC., Rust. Jackson.

V. CUCULLATA Ait., Marsh Blue Violet.
Dicaeoma violae Ktze., Rust. Oktibbeha.
Puccinia violae (Schum.) DC., Rust. Oktibbeha.

V. ERIOCARPA Schwein., Smoothish Yellow Violet.
Puccinia violae (Schum.) DC., Rust. Jackson.

V. ODORATA L., English or Sweet Violet.
Gloeosporium violae Berk. & Br., Leaf Spot. Lauderdale and Webster.

V. PALMATA L., Early Blue Violet
Cercospora violae Sacc., Leaf Spot. Oktibbeha.
Puccinia violae (Schum.) DC., Rust. Oktibbeha.

V. SP.
Alternaria violae Gall. & Dorsett, Leaf Spot. Hinds.
Colletotrichum violae-tricoloris R. E. Smith, Leaf Spot. Oktibbeha and Quitman.
Puccinia violae (Schum.) DC., Rust. Jackson.
Ramularia lactea (Desm.) Sacc., Leaf Spot. Harrison.
Septoria violae West., Leaf Spot. Leflore and Simpson.
Sphaceloma violae Jenkins, Scab. Pike.

VITIS

V. AESTIVALIS Michx., Summer Grape.
Phyllosticta viticola Sacc. & Speg., Leaf Spot. Harrison.

V. CORDIFOLIA Michx., Frost Grape.
Isariopsis clavispora (Berk. & Curt.) Sacc., Leaf Spot. Attala.
Uncinula necator (Schw.) Burr., Powdery Mildew. Oktibbeha.

V. LABRUSCA L., Northern Fox Grape.
Isariopsis clavispora (Berk. & Curt.) Sacc., Leaf Spot. Adams, Covington, Harrison,, and Lauderdale.
Plasmopara viticola (Berk. & Curt.) B. & DeT., Downy Mildew. George and Rankin.

V. ROTUNDIFOLIA Michx., Muscadine Grape.
Cercospora brachypus Ell. & Ev., Leaf Spot. Lauderdale.
Cercospora viticola (Ces.) Sacc., Leaf Spot. Lauderdale.
Glonium macrosporium Tracy & Earle. Lincoln.
Guignardia bidwellii (Ell.) Viala and Ravaz , Black Rot. Bolivar, Madison, and Webster.
Hysterographium vulvatum (Schw.) Rehm. Choctaw.
Melanconium fuligineum (Scrib. & Viala) Cav., Bitter Rot. George.
Phyllosticta labruscae Thuem., Leaf Spot. Harrison.

VITIS--cont.

V. ROTUNDIFOLIA--cont.

Phyllosticta viticola Sacc. & Speg., Leaf Spot. Franklin and George.

V. SP.

Cercospora viticola (Ces.) Sacc., Leaf Spot. Forrest and Webster.

Gloeosporium ampelophagum (Pass.) Sacc., Anthracnose. Jones and Oktibbeha.

Guignardia bidwellii (Ell.) Viala & Ravaz, Black Rot. Calhoun, Carroll, Clay, Greene, Hancock, Jackson, Neshoba, and Warren.

Isariopsis clavispora (Berk. & Curt.) Sacc., Leaf Spot. Jackson.

Plasmopara viticola (Berk. & Curt.) B. & DeT., Downy Mildew. Claiborne, Covington, Jones, Pearl River, and Stone.

Sphaceloma ampelinum DBy., Anthracnose. Adams, Amite, Jones, and Warren.

WEIGELA

W. SP.

Cercospora weigeliae Ell. & Ev., Leaf Spot. Coahoma.

Heterodera marioni (Cornu) Goodey, Root-knot. Coahoma, Greene, Lauderdale, Leflore, Stone, and Washington.

WISTARIA

W. SP.

Heterodera marioni (Cornu) Goodey, Root-knot. Jackson.

XANTHIUM

X. ORIENTALE L., Oriental Cocklebur.

Puccinia xanthii Schw., Rust. Oktibbeha and Simpson.

X. STRUMARIUM L., Cocklebur.

Erysiphe cichoracearum DC., Powdery Mildew. Covington.

XEROPHYLLUM

X. ASPHODELOIDES (L.) Nutt., Turkey-beard.

Puccinia atropuncta Pk. & Clint., Rust. Stone.

XYRIS

X. ELATA Chapm., Tall Yellow-eyed-grass.

Cercospora xyridis Miles, Leaf Spot. Stone.

YUCCA

Y. ALOIFOLIA L., Aloe Yucca.

Pleospora thuemeniana Sacc. Oktibbeha.

Y. FILAMENTOSA L., Adamsneedle Yucca.

Coniothyrium concentricum (Desm.) Sacc. Leflore.

Kellermannia yuccaegena Ell. & Ev., Leaf Spot. George.

Phoma concentrica Desm., Leaf Spot. Bolivar.

YUCCA--cont.

Y. GLAUCA Nutt., Small Soapweed.
Cylindrosporium angustifolium Ell. & Kell. Oktibbeha.

Y. GLORIOSA L., Moundlily Yucca: Spanish Bayonet.
Leptosphaeria obtusispora Speg., Leaf Spot. Clay, Lamar, and Monroe.

ZANTEDESCHIA

Z. AETHIOPICA, Common Calla.
Cercospora richardiaecola Atk., Leaf Spot. Forrest and Washington.

ZANTHOXYLUM

Z. AMERICANUM Mill., Prickly Ash.
Phyllactinia corylea (Pers.) Karst., Powdery Mildew. Choctaw.

ZEA

Z. MAYS L., Corn.
Cercospora sp. Oktibbeha.
Colletotrichum graminicolum (Ces.) G. W. Wils., Anthracnose.
Diplodia macrospora Earle. Oktibbeha.
Diplodia zeae (S.) Lév., Dry Rot. Choctaw and Stone.
Fusarium moniliforme Sheldon, Stalk Rot.
Gibberella saubinetti (Mont.) Sacc., Fusarium Blight, Scab. Alcorn.
Gloeocercospora sorghi Bain & Edgerton, Zonate Leaf Spot. Adams, Lauderdale, Neshoba, Oktibbeha, Pearl River, and Washington.
Helminthosporium maydis Nisik. & Mke., Leaf Spot. Oktibbeha.
Helminthosporium turcicum Pass., Leaf Blight. Oktibbeha.
Heterodera marioni (Cornu) Goodey, Root-knot. Holmes.
Physoderma zeae-maydis Shaw, Brown Spot. Jasper, Jones, Oktibbeha, Stone, and Warren.
Puccinia sorghi Schw., Rust. Adams, Bolivar, Claiborne, Forrest, Hinds, Pontotoc, Stone, and Tate.
Rhizoctonia solani Kuehn, Damping-Off.
Ustilago zeae (Berk.) Unger, Corn Smut. Jackson and Oktibbeha.

ZINNIA

Z. ELEGANS Jacq., Common Zinnia.
Cercospora atrocincta Heald & Wolf, Leaf Spot. Copiah, Simpson, and Stone.
Cercospora zinniae Ell. & Martin. Copiah, Holmes, Simpson, and Stone.
Erysiphe cichoracearum DC., Powdery Mildew. Chickasaw and Tate.

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ACROSPERMUM COMPRESSUM
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ACTINOMYCES IPOMOEA
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AECIDIUM OLDENLANDIANUM
Houstonia coerulea
AECIDIUM PHYSALIDIS
Physalis lanceolata

AGROBACTERIUM TUMEFACIENS
Begonia sp.
Gossypium hirsutum
Juniperus pfitzeriana
Malus baccata
Prunus persica
Rubus sp. (Boysenberry)

ALBUGO BLITI
Amaranthus retroflexus
ALBUGO CANDIDA
Arabis virginica
Brassica nigra
Bursa bursa-pastoris
Lepidium virginicum
ALBUGO IPOMOEAE-PANDURANAE
Ipomoea batatas
Ipomoea hederacea
Ipomoea pandurata
Ipomoea purpurea
ALBUGO TRAGOPOGONIS
Ambrosia artemisiifolia
Ambrosia trifida

ALLODUS CLAYTONIATA
Claytonia virginica

ALTERNARIA BRASSICAE
Brassica oleracea var. *capitata*
ALTERNARIA BRASSICAE var.
NIGRESCENS
Cucumis melo
ALTERNARIA DIANTHI
Dianthus caryophyllus
Dianthus sp. (Carnation)

ALTERNARIA FASCICULATA
Dahlia sp.
ALTERNARIA GOSSYPII
Gossypium herbaceum
Gossypium hirsutum
ALTERNARIA HERCULEA
Brassica rapa
ALTERNARIA SOLANI
Datura stramonium
Lycopersicon esculentum
Solanum tuberosum
ALTERNARIA VIOLAE
Viola sp.
ALTERNARIA SP.
Gossypium hirsutum

AMEROSPORIUM OECONOMICUM
Phaseolus sp. (Bean)
Vigna sinensis

APIOSPORIUM ERYSIPHIOIDES
Magnolia virginiana
Fraxinus sp. (dead wood of)
APIOSPORIUM MONTAGNEI
Arundinaria tecta

ARMILLARIA MELLEA
Malus sylvestris
Pyrus communis

ASCOCHYTA CLEMATIDINA
Clematis virginiana
ASCOCHYTA GOSSYPII
Gossypium hirsutum
ASCOCHYTA PINODELLA
Pisum sativum
ASCOCHYTA PISI
Medicago arabica
Pisum sativum
Vicia americana
Vicia angustifolia
Vicia sativa
Vicia villosa
ASCOCHYTA SORGHINA
Sorghum halepense
Sorghum vulgare
Sorghum sp.

ASCOCHYTA SP.
Vicia villosa

ASCOMYCETELLA QUERCINA
Quercus sp.

ASTERELLA MYRICAE
Myrica carolinensis

ASTERIDIUM ILLICII
Illicium floridanum

ASTERINA DELITESCENS
Persea borbonia
Persea pubescens
ASTERINA LEEMINGII
Galax sp.
ASTERINA PELLICULOSA
Ilex coriacea
Ilex opaca
ASTERINA SP.
Osmanthus fragrans

ASTEROSPORIUM BETULINUM
Betula lenta
ASTEROSPORIUM HOFFMANI
Fagus grandifolia

AULOGRAPHUM ANGUSTIFORME
Ilex coriacea

BACILLUS AMYLOVORUS
Pyrus communis

BACILLUS TRACHEIPHILUS
Cucumis sativus

BACTERIUM MARGINATUM
Gladiolus sp.
BACTERIUM PUERARIAE
Pueraria thunbergiana
BACTERIUM SOJAE
Soja max
BACTERIUM SOLANACEARUM
Lycopersicon esculentum
BACTERIUM VESICATORIUM
Capsicum annuum

BELONIUM EUSTEGIFORME
Arundinaria tecta

BJERKANDERA ADUSTA
Nyssa sylvatica

BOTRYOSPHAERIA RIBIS
Salix discolor

BOTRYTIS CINEREA
Hydrangea arborescens
BOTRYTIS PAEONIAE
Paeonia sp.
BOTRYTIS VULGARIS
Allium cepa
Fragaria sp.

BREMIA LACTUCAE
Krigia dandelion
Lactuca canadensis
Lactuca sativa

BUBAKIA CROTONIS
Croton capitatus
Croton monanthogynus

CAMAROSPORIUM AMORPHAE
Amorpha fruticosa
CAMAROSPORIUM ROBINIAE
Robinia pseudoacacia

CAPNODIUM CITRI
Citrus aurantium
Citrus nobilis unshiu

CERATOPHORUM ULMICOLUM
Ulmus fulva
Ulmus sp.
CERATOPHORUM UNCINATUM
Quercus macrocarpa

CERATOSTOMELLA FIMBRIATA
Ipomoea batatas

CERCOSPORA AGERATOIDIS
Eupatorium urticaefolium
CERCOSPORA ALTHAEINA
Althaea rosea
Malva rotundifolia

- CERCOSPORA ANTHELMINTICA
  - *Chenopodium ambrosioides*
- CERCOSPORA APII
  - *Apium graveolens*
  - *Daucus carota*
- CERCOSPORA ATROCINCTA
  - *Zinnia elegans*
- CERCOSPORA AURANTIA
  - *Citrus nobilis unshiu*
- CERCOSPORA BETICOLA
  - *Beta vulgaris*
- CERCOSPORA BLOXAMI
  - *Brassica oleracea* var. *capitata*
- CERCOSPORA BOLLEANA
  - *Ficus carica*
- CERCOSPORA BRACHYPUS
  - *Vitis rotundifolia*
- CERCOSPORA BRUNKII
  - *Pelargonium* sp.
- CERCOSPORA CAESPITOSA
  - *Chloris schwartziana*
- CERCOSPORA CALLICARPAE
  - *Callicarpa americana*
- CERCOSPORA CANESCENS
  - *Phaseolus lunatus*
  - *Vigna sinensis*
- CERCOSPORA CAPREOLATA
  - *Bignonia capreolata*
- CERCOSPORA CAPSICI
  - *Capsicum annuum*
  - *Capsicum* sp. (Pepper)
- CERCOSPORA CATENOSPORA
  - *Sambucus canadensis*
  - *Sambucus nigra*
- CERCOSPORA CAULOPHYLLI
  - *Caulophyllum thalictroides*
- CERCOSPORA CEPHALANTHI
  - *Cephalanthus occidentalis*
- CERCOSPORA CERASELLA
  - *Prunus domestica*
- CERCOSPORA CERCIDICOLA
  - *Cercis canadensis*
- CERCOSPORA CHAMAECRISTAE
  - *Cassia marilandica*
- CERCOSPORA CIRCUMSCISSA
  - *Prunus angustifolia* var. *watsoni*
  - *Prunus persica*
- CERCOSPORA CITRULLINA
  - *Citrullus vulgaris*
- CERCOSPORA CLAVATA
  - *Asclepias incarnata*
  - *Asclepias syriaca*
- CERCOSPORA CONCORS
  - *Solanum tuberosum*
- CERCOSPORA CRUENTA
  - *Phaseolus vulgaris*
  - *Phaseolus* sp. (Bean)
  - *Soja max*
  - *Vigna sinensis*
  - *Vigna* sp.
- CERCOSPORA CYDONIAE
  - *Cydonia japonica*
- CERCOSPORA DAIZU
  - *Soja max*
- CERCOSPORA DEPAZEOIDES
  - *Sambucus canadensis*
  - *Sambucus nigra*
- CERCOSPORA DESTRUCTIVA
  - *Euonymus japonicus*
- CERCOSPORA DIODIAE
  - *Diodia teres*
- CERCOSPORA DIODIAE-VIRGINIANAE
  - *Diodia teres*
- CERCOSPORA DIOSPYRI
  - *Diospyros virginiana*
- CERCOSPORA ECHII
  - *Echium vulgare*
- CERCOSPORA ELAEAGNI
  - *Elaeagnus* sp. (Silverberry)
- CERCOSPORA ERYTHROGENA
  - *Rhexia mariana*
- CERCOSPORA FICI
  - *Ficus carica*
- CERCOSPORA FLEXUOSA
  - *Diospyros virginiana*
- CERCOSPORA FULIGINOSA
  - *Diospyros virginiana*
- CERCOSPORA FUSCA
  - *Carya illinoensis*
  - *Carya* sp.
- CERCOSPORA GERARDIAE
  - *Dasystoma virginica*
- CERCOSPORA GNAPHALIACEA
  - *Gnaphalium purpureum*
- CERCOSPORA GOSSYPINA
  - *Gossypium hirsutum*
- CERCOSPORA GRISEA
  - *Polygala lutea*

- CERCOSPORA HIBISCI
  - *Hibiscus esculentus*
- CERCOSPORA HYDRANGEAE
  - *Hydrangea* sp.
- CERCOSPORA HYDROCOTYLES
  - *Hydrocotyle verticillata*
- CERCOSPORA ILICIS
  - *Ilex opaca*
- CERCOSPORA LEUCOSTICTA
  - *Melia azedarach*
- CERCOSPORA LIGUSTRI
  - *Ligustrum japonicum*
  - *Ligustrum lodense*
  - *Ligustrum* sp.
- CERCOSPORA LILACIS
  - *Syringa persica*
- CERCOSPORA LIPPIAE
  - *Lippia lanceolata*
- CERCOSPORA LIQUIDAMBARIS
  - *Liquidambar styraciflua*
- CERCOSPORA LIRIODENDRI
  - *Liriodendron tulipifera*
- CERCOSPORA MALI
  - *Malus sylvestris*
- CERCOSPORA MEDICAGINIS
  - *Medicago arabica*
  - *Medicago hispida*
  - *Medicago sativa*
- CERCOSPORA MELANOCHAETA
  - *Celastrus scandens*
- CERCOSPORA MELIAE
  - *Melia azedarach*
- CERCOSPORA MENISPERMI
  - *Menispermum canadense*
- CERCOSPORA MICROSORA
  - *Tilia americana*
- CERCOSPORA MINIMA
  - *Pyrus communis*
- CERCOSPORA MINUTA
  - *Polygala lutea*
- CERCOSPORA MISSISSIPPIENSIS
  - *Smilax glauca*
  - *Smilax* sp.
- CERCOSPORA MORICOLA
  - *Morus rubra*
- CERCOSPORA NICOTIANAE
  - *Nicotiana* sp.
- CERCOSPORA NIGRICANS
  - *Cassia tora*
- CERCOSPORA NYMPHAEACEA
  - *Nymphaea* sp.
- CERCOSPORA OCCIDENTALIS
  - *Cassia occidentalis*
- CERCOSPORA OLIVACEA
  - *Gleditsia triacanthos*
- CERCOSPORA OPULI
  - *Viburnum opulus*
- CERCOSPORA PENICILLUS
  - *Myrica cerifera*
- CERCOSPORA PERICLYMENI
  - *Lonicera japonica*
- CERCOSPORA PERSICAE
  - *Prunus persica*
- CERCOSPORA PERSONATA
  - *Arachis hypogaea*
- CERCOSPORA PHLOGINA
  - *Phlox* sp.
- CERCOSPORA POLYGONACEA
  - *Tiniaria convolvulus*
- CERCOSPORA PUERARICOLA
  - *Pueraria thunbergiana*
- CERCOSPORA PULVINULATA
  - *Morus rubra*
- CERCOSPORA PURPUREA
  - *Persea pubescens*
- CERCOSPORA PUSTULA
  - *Parthenocissus quinquefolia*
- CERCOSPORA RACEMOSA
  - *Teucrium canadense*
- CERCOSPORA RESEDAE
  - *Reseda odorata*
- CERCOSPORA RHOINA
  - *Rhus glabra*
- CERCOSPORA RIBICOLA
  - *Ribes triste*
- CERCOSPORA RICHARDIAECOLA
  - *Zantedeschia aethiopica*
- CERCOSPORA ROSICOLA
  - *Rosa* sp. (Rose)
- CERCOSPORA RUBI
  - *Rubus trivialis*
  - *Rubus* sp. (Dewberry)
- CERCOSPORA SAGITTARIAE
  - *Sagittaria latifolia*
- CERCOSPORA SALICINA
  - *Salix discolor*
  - *Salix* sp.
- CERCOSPORA SAURURI
  - *Saururus cernuus*

CERCOSPORA SCUTELLARIAE
Scutellaria incana
CERCOSPORA SEDOIDES
Pittosporum sp.
CERCOSPORA SEYMOURIANA
Gleditsia triacanthos
CERCOSPORA SII
Sium cicutaefolium
CERCOSPORA SILPHII
Silphium integrifolium
CERCOSPORA SIMULATA
Cassia marilandica
CERCOSPORA SMILACIS
Smilax glauca
Smilax laurifolia
Smilax sp.
CERCOSPORA SORDIDA
Campsis radicans
CERCOSPORA SORGHI
Sorghum vulgare
CERCOSPORA SPHAEROIDEA
Cassia occidentalis
CERCOSPORA STIZOLOBII
Stizolobium deeringianum
CERCOSPORA STYRACAE
Styrax americana
CERCOSPORA TEUCRII
Teucrium canadense
CERCOSPORA THUJINA
Thuja orientalis
CERCOSPORA TUBERCULANS
Liquidambar styraciflua
CERCOSPORA UMBRATA
Bidens frondosa
CERCOSPORA VARIA
Viburnum cassinoides
Viburnum opulus
CERCOSPORA VERNONIAE
Vernonia baldwini
CERCOSPORA VIGNAE
Vigna sinensis
CERCOSPORA VIOLAE
Viola blanda
Viola palmata
CERCOSPORA VITICOLA
Vitis rotundifolia
Vitis sp.
CERCOSPORA WEIGELIAE
Weigela sp.

CERCOSPORA XYRIDIS
Xyris elata
CERCOSPORA ZEBRINA
Medicago arabica
Medicago hispida
Trifolium incarnatum
CERCOSPORA ZINNIAE
Zinnia elegans
CERCOSPORA SP.
Coreopsis sp.
Crotalaria spectabilis
Hibiscus esculentus
Pittosporum sp.
Zea mays

CERCOSPORELLA ALBO-MACULANS
Brasica rapa
CERCOSPORELLA CANA
Erigeron philadelphicus
CERCOSPORELLA PERSICAE
Prunus persica

CEREBELLA ANDROPOGONIS
Andropogon furcatus
Axonopus sp. (Carpet Grass)
Erianthus contortus
Sorghastrum nutans

CHOANEPHORA CUCURBITARUM
Vigna sinensis

CINTRACTIA AXICOLA
Fimbristylis autumnalis
CINTRACTIA JUNCI
Juncus acuminatus

CLADOSPORIUM CARPOPHILUM
Prunus persica
CLADOSPORIUM CITRI
Citrus aurantium
Citrus nobilis unshiu
Citrus reticulata
Citrus sinensis
Citrus sp.
CLADOSPORIUM EFFUSUM
Carya illinoensis
CLADOSPORIUM FASCICULARE
Asparagus sprengeri

CLADOSPORIUM FULVUM
  Lycopersicon esculentum
CLADOSPORIUM FUSCUM
  Rosa sp. (Rose)
CLADOSPORIUM CLOEOSPORIOIDES
  Ascyrum stans
CLADOSPORIUM HERBARUM
  Citrus aurantium
CLADOSPORIUM NERVALE
  Rhus typhina
CLADOSPORIUM PAEONIAE
  Paeonia delicatissima
  Paeonia sp.
CLADOSPORIUM VIGNAE
  Vigna sinensis

CLASTEROSPORIUM UNCINATUM
  Carya cordiformis
CLASTEROSPORIUM SP.
  Diospyros virginiana

CLAVICEPS PASPALI
  Paspalum dilatatum
  Paspalum sp.

COCCOIDELLA SCUTULA
  Persea borbonia

COCCOMYCES DENTATUS
  Quercus sp.
COCCOMYCES HIEMALIS
  Prunus cerasus
  Prunus domestica
  Prunus sp. (Wild Cherry, and sp.)
COCCOMYCES KERRIAE
  Kerria japonica
COCCOMYCES LUTESCENS
  Prunus laurocerasus
COCCOMYCES PRUNOPHORAE
  Prunus sp. (Green Gage Plum)

COLEOSPORIUM CAMPANULAE
  Campanula americana
COLEOSPORIUM CARNEUM
  Vernonia sp.
COLEOSPORIUM DELICATULUM
  Pinus palustris
COLEOSPORIUM ELEPHANTOPODIS
  Elephantopus carolinianus
(Coleosporium elephantopodis)
  Elephantopus nudatus
  Elephantopus tomentosus
  Pinus palustris
COLEOSPORIUM HELIANTHI
  Helianthus giganteus
COLEOSPORIUM IPOMOEAE
  Ipomoea barbigera
  Ipomoea digitata
  Ipomoea hederacea
  Ipomoea lacunosa
  Ipomoea pandurata
  Ipomoea purpurea
  Ipomoea sp.
  Pinus palustris
  Quamoclit pennata
COLEOSPORIUM SOLIDAGINIS
  Aster sagittifolius
  Pinus echinata
  Pinus taeda
  Solidago canadensis
  Solidago fistulosa
  Solidago sp.
COLEOSPORIUM TEREBINTHINACEAE
  Silphium asperrimum
COLEOSPORIUM VERNONIAE
  Pinus caribaea
  Pinus palustris
  Vernonia altissima
  Vernonia baldwini
  Vernonia fasciculata

COLLETOTRICHUM AGAVES
  Agave americana
COLLETOTRICHUM ANTIRRHINI
  Antirrhinum majus
COLLETOTRICHUM CAMELLIAE
  Camellia japonica
COLLETOTRICHUM FALCATUM
  Saccharum officinarum
  Sorghum halepense
COLLETOTRICHUM GLOEOSPORIOIDES
  Citrus aurantium
  Citrus grandis
  Citrus nobilis
  Citrus nobilis unshiu
  Citrus sp. (Grapefruit)
  Citrus sp.
  Poncirus trifoliata

COLLETOTRICHUM GRAMINICOLUM
Avena sativa
Bromus secalinus
Secale cereale
Sorghum vulgare
Triticum aestivum
Zea mays
COLLETOTRICHUM GRISEUM
Euonymus japonicus
COLLETOTRICHUM HIGGINSIANUM
Brassica rapa
COLLETOTRICHUM LAGENARIUM
Citrullus vulgaris
Cucumis melo var. *cantalupensis*
Cucumis sativus
COLLETOTRICHUM LINDEMUTHIANUM
Phaseolus lunatus
Phaseolus vulgaris
COLLETOTRICHUM LINEOLA
Sorghum vulgare var. *technicum*
COLLETOTRICHUM SPINACIAE
Spinacia oleracea
COLLETOTRICHUM TRIFOLII
Medicago sativa
COLLETOTRICHUM TRUNCATUM
Phaseolus lunatus
COLLETOTRICHUM VICIAE
Vicia villosa
COLLETOTRICHUM VIOLAE-TRICOLORIS
Viola sp.
COLLETOTRICHUM SP.
Camellia japonica
Ipomoea batatas
Melia azedarach
Rhododendron sp.

CONIOSPORIUM ARUNDINELLAE
Arundinaria tecta

CONIOTHYRIUM CONCENTRICUM
Yucca filamentosa
CONIOTHYRIUM FUCKELII
Rosa sp. (Rose)
Smilax sp.
CONIOTHYRIUM WERNSDORFFIAE
Rosa sp. (Rose)

CORTICIUM LAETUM
Ficus carica
CORTICIUM OAKESII
Ostrya virginiana
CORTICIUM OCHROLEUCUM
Malus sylvestris
CORTICIUM SALMONICOLOR
Malus sp. (Apple)
Pyrus communis
CORTICIUM STEVENSII
Aleurites fordii
Ficus carica
Malus sylvestris
Pyrus sinensis
CORTICIUM VAGUM
Crotalaria spectabilis
Phaseolus vulgaris
Vigna sinensis

CORYNEUM BEYERINCKII
Prunus persica
CORYNEUM KUNZEI
Forsythia sp.

CREONECTRIA PURPUREA
Acer rubrum
Betula lenta

CRONARTIUM COMANDRAE
Comandra umbellata
CRONARTIUM QUERCUUM
Pinus caribaea
Pinus taeda
Quercus marilandica
Quercus virginiana

CRYPTOMYCES PTERIDIS
Pteridium aquilinum

CRYPTOSPORIUM ACICOLA
Pinus palustris

CUSCUTA SP.
Solanum melongena

CYLINDROSPORIUM ANGUSTIFOLIUM
Yucca glauca
CYLINDROSPORIUM BRASSICAE
Brassica rapa

- CYLINDROSPORIUM CHRYSANTHEMI
  - Chrysanthemum sp.
- CYLINDROSPORIUM CLEMATIDIS
  - Clematis virginiana
- CYLINDROSPORIUM JUGLANDIS
  - Juglans sp.
- CYLINDROSPORIUM LUTESCENS
  - Prunus serotina
- CYLINDROSPORIUM MINUS
  - Fraxinus sp.
- CYLINDROSPORIUM NEGUNDINIS
  - Acer negundo
- CYLINDROSPORIUM OCULATUM
  - Populus deltoides
- CYLINDROSPORIUM PADI
  - Prunus laurocerasus
  - Prunus serotina
  - Prunus sp. (Cherry)
- CYLINDROSPORIUM RUBI
  - Rubus occidentalis
- CYLINDROSPORIUM SACCHARINUM
  - Acer rubrum
- CYLINDROSPORIUM TOXICODENDRI
  - Rhus toxicodendron
- CYLINDROSPORIUM ULMICOLA
  - Ulmus alata
  - Ulmus americana

- CYSTOPUS IPOMOEAE-PANDURANAE
  - Ipomoea hederacea
- CYSTOPUS PORTULACAE
  - Portulaca oleracea

- CYTOSPORA AILANTHI
  - Ailanthus altissima
- CYTOSPORA CORNUI
  - Cornus sp. (Dogwood)
- CYTOSPORA JUGLANDICOLA
  - Juglans nigra
- CYTOSPORA NIVEA
  - Populus sp.
- CYTOSPORA SAMBUCINA
  - Sambucus canadensis

- DARLUCA FILUM
  - Salix nigra

- DENDROPHOMA OBSCURANS
  - Fragaria sp.

- DIAPORTHE CITRI
  - Fortunella sp. (Kumquat)
- DIAPORTHE LEIPHAEMIA
  - Quercus alba
- DIAPORTHE PHASEOLORUM
  - Phaseolus lunatus
  - Phaseolus sp. (Bean)
- DIAPORTHE SOJAE
  - Soja max
- DIAPORTHE UMBRINA
  - Rosa sp.

- DIATRYPE ALBOPRUINOSA
  - Ostrya virginiana
  - Quercus sp.
- DIATRYPE CALLICARPAE
  - Callicarpa americana
- DIATRYPE CONSOBRINA
  - Arundinaria tecta
  - Arundinaria sp.
- DIATRYPE VIRESCENS
  - Fagus grandifolia

- DIATRYPELLA BETULINA
  - Betula lenta
- DIATRYPELLA DISCOIDEA
  - Alnus rugosa
- DIATRYPELLA HYSTERIOIDES
  - Carya sp.
- DIATRYPELLA PROMINENS
  - Platanus occidentalis
- DIATRYPELLA PULCHERRIMA
  - Salix sp.

- DIBOTRYON MORBOSUM
  - Prunus americana
  - Prunus angustifolia
  - Prunus domestica
  - Prunus serotina
  - Prunus sp. (Japanese Plum)
  - Prunus sp. (Plum)

- DICAEOMA CEPHALANTHI
  - Spartina cynosuroides
- DICAEOMA EATONIAE
  - Ranunculus abortivus
- DICAEOMA HELIANTHI-MOLLIS
  - Helianthus divaricatus

DICAEOMA HIERACIATUM
Lactuca canadensis
DICAEOMA RHAMNI
Avena sativa
DICAEOMA SMILACIS
Smilax sp.
DICAEOMA VIOLAE
Viola cucullata

DIDYMARIA UNGERI
Ranunculus septentrionalis

DIDYMELLA ANDROPOGONIS
Andropogon muricatus

DIDYMELLINA IRIDIS
Iris sp.
DIDYMELLINA MACROSPORA
Iris sp.

DIMEROSPORIUM PULCHRUM
Fraxinus sp.

DINEMASPORIUM GRAMINEUM
Eragrostis sp.

DIPLOCARPON EARLIANA
Fragaria virginiana
Fragaria sp.
DIPLOCARPON ROSAE
Rosa sp. (Rose)

DIPLODIA AMORPHAE
Amorpha fruticosa
DIPLODIA CAMPHORAE
Cinnamomum camphora
DIPLODIA GOSSYPINA
Gossypium hirsutum
DIPLODIA MACROSPORA
Zea mays
DIPLODIA SASSAFRAS
Sassafras albidum
DIPLODIA ZEAE
Zea mays

DIPLODINA PRUNI
Prunus demissa

DISCELLA CARBONACEA
Salix sp.

DISCOSIA ARTOCREAS
Crataegus mollis
Cydonia oblonga
Rhus toxicodendron
DISCOSIA SMILACINA
Smilax hispida

DISCULA BRENCKLEANA
Salix sp.

DOTHICHLOË ATRAMENTOSA
Panicum sp.

DOTHIDEA SOLIDAGINIS
Solidago sp.

DOTHIDELLA CONCAVIUSCULA
Magnolia virginiana
DOTHIDELLA RIBESIA
Ribes sp.

ENDOTHIA PARASITICA
Castanea dentata
Castanea sp.

ENTOMOSPORIUM MACULATUM
Cydonia oblonga
Pyrus communis
ENTOMOSPORIUM THUEMENII
Crataegus sp.

ENTYLOMA COMPOSITARUM
Eupatorium urticaefolium
ENTYLOMA LINARIAE
Veronica peregrina
ENTYLOMA PHYSALIDIS
Physalis virginiana

EPICHLOË TYPHINA
Panicularia nervata
Sphenopholis sp.

EPICOCCUM SIMPLEX
Arundinaria sp. (Cane)

ERYSIPHE CICHORACEARUM
Ambrosia artemisiifolia
Ambrosia trifida
Cucumis sativus
Helianthus hirsutus
Helianthus tuberosus
Helianthus sp.
Mesadenia atriplicifolia
Phlox paniculata
Plantago major
Polygonum erectum
Solidago sp.
Verbena stricta
Verbena sp.
Xanthium strumarium
Zinnia elegans
ERYSIPHE COMMUNIS
Ranunculus abortivus
ERYSIPHE GALEOPSIDIS
Chelone glabra
ERYSIPHE GRAMINIS
Hordeum pusillum
Poa pratensis
ERYSIPHE LAGERSTROEMIAE
Lagerstroemia indica
ERYSIPHE POLYGONI
Phaseolus vulgaris
Pisum sativum
Trifolium dubium
Trifolium pratense
Trifolium procumbens
Trifolium repens
Vicia villosa

EUTYPELLA CERVICULATA
Alnus sp.
EUTYPELLA PLATANI
Platanus occidentalis
EUTYPELLA STELLULATA
Celtis sp.

EXOBASIDIUM AZALEAE
Rhododendron indicum
Rhododendron sp.
EXOBASIDIUM LEUCOTHOES
Leucothoë axillaris
EXOBASIDIUM SYMPLOCI
Symplocos tinctoria

EXOBASIDIUM VACCINII
Rhododendron viscosum
Rhododendron sp.
Vaccinium tenellum

EXOSPORIUM CONCENTRICUM
Euonymus japonicus
EXOSPORIUM PALMIVORUM
Phoenix canariensis
Phoenix dactylifera
Phoenix sp.
EXOSPORIUM PLATANI
Platanus occidentalis
EXOSPORIUM TILIAE
Tilia americana

FABRAEA MACULATA
Cydonia oblonga
Pyrus communis
Pyrus sinensis
Pyrus sp.

FROMMEA DUCHESNEAE
Duchesnea indica
FROMMEA OBTUSA
Potentilla canadensis

FUSARIUM ANNUUM
Capsicum annuum
FUSARIUM BATATATIS
Ipomoea batatas
FUSARIUM BULBIGENUM var. NIVEUM
Citrullus vulgaris
FUSARIUM BULBIGENUM var. TRACHEIPHILUM
Crotalaria intermedia
FUSARIUM CULMORUM
Triticum aestivum
FUSARIUM HYPEROXYSPORUM
Ipomoea batatas
FUSARIUM LYCOPERSICI
Lycopersicon esculentum
FUSARIUM MONILIFORME
Zea mays
FUSARIUM OXYSPORUM f. CONGLUTINANS
Callistephus chinensis
FUSARIUM OXYSPORUM f. LYCOPERSICI
Lycopersicon esculentum

- FUSARIUM OXYSPORUM f. NIVEUM
  - *Citrullus vulgaris*
- FUSARIUM OXYSPORUM f. VASINFECTUM
  - *Gossypium hirsutum*
- FUSARIUM RUBI
  - *Rubus* sp. (Youngberry)
- FUSARIUM VASINFECTUM
  - *Gossypium hirsutum*
- FUSARIUM VASINFECTUM var. TRACHEIPHILUM
  - *Vigna sinensis*
- FUSARIUM SPP.
  - *Gossypium hirsutum*
- FUSARIUM SP.
  - *Gladiolus* sp.
- FUSARIUM SPP.
  - *Ipomoea batatas*

- FUSICLADIUM ALOPECURI
  - *Alopecurus aequalis*
- FUSICLADIUM EFFUSUM
  - *Carya illinoensis*

- GIBBERELLA SAUBINETTI
  - *Triticum aestivum*
  - *Zea mays*

- GLENOSPORA CURTISII
  - *Nyssa* sp.

- GLOEOCERCOSPORA SORGHI
  - *Saccharum officinarum*
  - *Sorghum vulgare*
  - *Zea mays*

- GLOEODES POMIGENA
  - *Malus sylvestris*

- GLOEOSPORIUM AMPELOPHAGUM
  - *Vitis* sp.
- GLOEOSPORIUM CACTORUM
  - *Cactus* sp.
  - *Opuntia* sp.
- GLOEOSPORIUM CAMPHORAE
  - *Cinnamomum camphora*
- GLOEOSPORIUM CANADENSE
  - *Quercus alba*
- GLOEOSPORIUM DIOSPYRI
  - *Diospyros kaki*
  - *Diospyros virginiana*
- GLOEOSPORIUM NERVISEQUUM
  - *Platanus occidentalis*
  - *Quercus rubra*
- GLOEOSPORIUM OLEANDRI
  - *Nerium oleander*
- GLOEOSPORIUM OPUNTIAE
  - *Opuntia* sp.
- GLOEOSPORIUM PERENNANS
  - *Pyrus communis*
- GLOEOSPORIUM PIPERATUM
  - *Capsicum* sp.
- GLOEOSPORIUM ROSAE
  - *Rosa* sp.
- GLOEOSPORIUM RUBI
  - *Rubus procumbens*
- GLOEOSPORIUM TINEUM
  - *Sambucus canadensis*
- GLOEOSPORIUM ULMICOLUM
  - *Ulmus americana*
- GLOEOSPORIUM VIOLAE
  - *Viola odorata*
- GLOEOSPORIUM SP.
  - *Camellia* sp.
  - *Ficus carica*
  - *Hydrangea* sp.

- GLOMERELLA CINCTA
  - *Ficus elastica*
- GLOMERELLA CINGULATA
  - *Camellia japonica*
  - *Euonymus japonicus*
  - *Ligustrum indicum*
  - *Ligustrum ovalifolium*
  - *Malus sylvestris*
- GLOMERELLA FRUCTIGENA
  - *Ficus carica*
- GLOMERELLA GOSSYPII
  - *Gossypium herbaceum*
  - *Gossypium hirsutum*
- GLOMERELLA PIPERATA
  - *Capsicum* sp.
- GLOMERELLA RUFOMACULANS
  - *Lathyrus odoratus*

- GLOMERULARIA CORNI
  - *Cornus* sp.

- GLONIUM MACROSPORIUM
  - *Vitis rotundifolia*

GNOMONIA ILIAU
Saccharum officinarum
GNOMONIA LEPTOSTYLA
Juglans sp.
GNOMONIA NERVISEDA
Carya illinoensis
GNOMONIA SETACEA
Carya illinoensis
GNOMONIA ULMEA
Ulmus americana
Ulmus crassifolia
GNOMONIA VENETA
Platanus occidentalis

GNOMONIELLA AMOENA
Liquidambar styraciflua

GONOBOTRYUM MACULICOLA
Hamamelis virginiana

GRAPHIOLA PHOENICIS
Phoenix dactylifera

GUIGNARDIA BIDWELLII
Vitis rotundifolia
Vitis sp.

GYMNOCONIA INTERSTITIALIS
Rubus occidentalis
Rubus procumbens
Rubus sp. (Blackberry)
GYMNOCONIA PECKIANA
Rubus procumbens
Rubus sp. (Blackberry)

GYMNOSPORANGIUM BERMUDIANUM
Juniperus bermudiana
Juniperus virginiana
GYMNOSPORANGIUM CLAVIPES
Crataegus crus-galli
Crataegus sp. (Hawthorn)
Crataegus sp.
Cydonia oblonga
Juniperus virginiana
GYMNOSPORANGIUM FLORIFORME
Crataegus spathulata
Juniperus virginiana
GYMNOSPORANGIUM GLOBOSUM
Crataegus coccinea
(Gymnosporangium globosum)
Crataegus submollis
Crataegus sp. (Hawthorn)
Crataegus sp. (Crabapple)
Crataegus sp. (Mayhaw)
Juniperus virginiana
GYMNOSPORANGIUM JUNIPERI
Malus sylvestris
GYMNOSPORANGIUM JUNIPERI-VIRGINIANA
Malus ioensis
Malus sylvestris
Malus sp. (Flowering Crabapple)
GYMNOSPORANGIUM NIDUS-AVIS
Amelanchier canadensis
Juniperus virginiana
GYMNOSPORANGIUM TRACHYSORUM
Crataegus crus-galli
Crataegus marshallii

HAPLOSPORELLA CLINTONII
Acer negundo
HAPLOSPORELLA SERIATA
Sambucus canadensis

HELMINTHOSPORIUM GENICULATUM
Eragrostis sp.
HELMINTHOSPORIUM MAYDIS
Zea mays
HELMINTHOSPORIUM RAVENELLI
Sporobolus indicus
HELMINTHOSPORIUM SATIVUM
Hordeum vulgare
HELMINTHOSPORIUM TURCICUM
Zea mays
HELMINTHOSPORIUM SP.
Avena sativa
Hordeum vulgare
Kyllinga pumila
Trifolium sp.

HENDERSONIA TYPHAE
Typha latifolia

HENDERSONULA ARISTIDAE
Aristida purpurascens

- HETERODERA MARIONI
  - *Abelia* sp.
  - *Aleurites fordii*
  - *Althaea* sp.
  - *Antirrhinum* sp.
  - *Beta vulgaris*
  - *Brassica oleracea* var. *capitata*
  - *Brassica rapa*
  - *Buxus* sp.
  - *Cactus* sp.
  - *Caladium* sp.
  - *Capsicum* sp.
  - *Celosia* sp.
  - *Chrysanthemum* sp.
  - *Citrullus vulgaris*
  - *Cucumis melo* var. *cantalupensis*
  - *Cucumis sativus*
  - *Cucurbita pepo*
  - *Cyclamen* sp.
  - *Dahlia* sp.
  - *Deutzia* sp.
  - *Dianthus* sp.
  - *Euonymus* sp.
  - *Ficus carica*
  - *Forsythia* sp.
  - *Fragaria* sp.
  - *Gardenia* sp.
  - *Ginkgo biloba*
  - *Gladiolus* sp.
  - *Gossypium* sp.
  - *Hibiscus esculentus*
  - *Hydrangea* sp.
  - *Ipomoea batatas*
  - *Ligustrum* sp.
  - *Lycopersicon esculentum*
  - *Malus* sp. (Apple)
  - *Narcissus* sp.
  - *Paeonia* sp.
  - *Phaseolus lunatus*
  - *Phaseolus vulgaris*
  - *Pisum* sp.
  - *Prunus persica*
  - *Pueraria thunbergiana*
  - *Punica* sp.
  - *Pyrus communis*
  - *Raphanus* sp.
  - *Rosa* sp. (Rose)

- (Heterodera marioni)
  - *Salix* sp. (Willow)
  - *Sida* sp.
  - *Solanum melongena*
  - *Solanum tuberosum*
  - *Spiraea* sp.
  - *Vernonia* sp.
  - *Viburnum* sp.
  - *Vigna sinensis*
  - *Weigela* sp.
  - *Wisteria* sp.
  - *Zea mays*

- HETEROSPORIUM ALLII
  - *Allium canadense*
- HETEROSPORIUM SYRINGAE
  - *Syringa* sp. (Lilac)

- HYALOPSORA POLYPODII
  - *Cystopteris fragilis*

- HYPOCHNUS OCHROLEUCUS
  - *Malus sylvestris*

- HYPOCRELLA HYPOXYLON
  - *Panicum anceps*

- HYPODERMA HEDGCOCKII
  - *Pinus echinata*
  - *Pinus virginiana*
- HYPODERMA ILICINUM
  - *Quercus* sp.
- HYPODERMA LETHALE
  - *Pinus caribaea*
  - *Pinus echinata*
- HYPODERMA SCIRPINUM
  - *Scirpus* sp.

- HYPOXYLON ANNULATUM
  - *Acer rubrum*
  - *Quercus* sp.
- HYPOXYLON ATROPUNCTATUM
  - *Quercus* sp.
- HYPOXYLON FUSCUM
  - *Alnus* sp.
- HYPOXYLON INSIDENS
  - *Liriodendron tulipifera*
- HYPOXYLON MALLEOLUS
  - *Quercus* sp.

HYPOXYLON PERFORATUM
Arundinaria sp.
Liquidambar styraciflua
HYPOXYLON PUNCTULATUM
Quercus sp.
HYPOXYLON SUBCHLORINUM
Carpinus sp.

HYSTEROGRAPHIUM VULVATUM
Vitis rotundifolia

ISARIOPSIS ALBOROSELLA
Cerastium vulgatum
ISARIOPSIS CLAVISPORA
Vitis cordifolia
Vitis labrusca
Vitis sp.
ISARIOPSIS GRISEOLA
Phaseolus vulgaris

KELLERMANNIA YUCCAEGENA
Yucca filamentosa

KUEHNEOLA DUCHESNEAE
Duchesnea indica
KUEHNEOLA MALVICOLA
Hibiscus syriacus
KUEHNEOLA UREDINIS
Rubus procumbens
Rubus trivialis
Rubus sp.

KUNKELIA NITENS
Rubus procumbens
Rubus sp.

LAESTADIA BUXI
Buxus sempervirens
LAESTADIA ILLICIICOLA
Illicium floridanum

LEMBOSIA ANGUSTIFORMIS
Ilex coriacea
LEMBOSIA ILLICIICOLA
Illicium floridanum

LEPTOSPHAERIA CONIOTHYRIUM
Rubus sp. (Raspberry)
Rubus sp. (Youngberry)

LEPTOSPHAERIA OBTUSISPORA
Yucca gloriosa

LEPTOSTROMELLA FILICINA
Osmunda cinnamomea

LEPTOTHYRIUM CASTANICOLUM
Castanea dentata
LEPTOTHYRIUM CINCTUM
Prunus serotina
LEPTOTHYRIUM DRYINUM
Quercus falcata
Quercus stellata
LEPTOTHYRIUM PERONAE
Paeonia sp.
LEPTOTHYRIUM POMI
Malus sylvestris

LOPHODERMIUM AUSTRALE
Pinus palustris
Pinus taeda
LOPHODERMIUM CYRILLICOLA
Cyrilla racemiflora

MACROPHOMA CANDOLLEI
Buxus sempervirens
Buxus sp.
MACROPHOMA FICI
Ficus carica
MACROPHOMA SP.
Mahonia sp.

MACROPHOMINA PHASEOLI
Phaseolus vulgaris

MACROSPORIUM CAROTAE
Daucus carota
MACROSPORIUM CATALPAE
Catalpa bignonioides
MACROSPORIUM COMMUNE
Allium sp.
MACROSPORIUM CUCUMERINUM
Cucumis melo
MACROSPORIUM FASCICULATUM
Ilex opaca
MACROSPORIUM HERCULEUM
Brassica nigra
MACROSPORIUM NERII
Nerium oleander

MACROSPORIUM NIGRICANTIUM
Gossypium hirsutum
MACROSPORIUM PARASITICUM var. PORRI
Allium cepa
MACROSPORIUM PODOPHYLLI
Podophyllum peltatum
MACROSPORIUM SARCINULA
Allium cepa
MACROSPORIUM SOLANI
Datura stramonium

MARSSONIA DELASTREI
Agrostemma githago
MARSSONIA JUGLANDIS
Juglans cinerea
Juglans nigra
Juglans sp.
MARSSONIA MARTINI
Quercus alba
Quercus macrocarpa
Quercus marilandica
Quercus prinoides
Quercus prinus
Quercus sp.
MARSSONIA POPULI
Populus tremuloides
MARSSONIA QUERCUS
Quercus muhlenbergii
MARSSONIA RHABDOSPORA
Populus nigra

MASSARIA INQUINANS
Acer sp.

MELAMPSORA ABIETI-CAPREARUM
Salix interior
MELAMPSORA AMERICANA
Salix interior
MELAMPSORA BIGELOWII
Salix nigra
MELAMPSORA MEDUSAE
Populus deltoides
MELAMPSORA SP.
Populus sp.

MELANCONIS MARGINALIS
Alnus rugosa
MELANCONIS STILBOSTOMA
Betula lenta

MELANCONIUM BICOLOR
Betula sp.
MELANCONIUM FULIGINEUM
Vitis rotundifolia
MELANCONIUM SACCHARI
Saccharum officinarum
MELANCONIUM VISCOSUM
Robinia pseudoacacia

MELASMIA GLEDITSCHIAE
Gleditsia triacanthos

MELIOLA AMPHITRICHA
Magnolia grandiflora
Magnolia virginiana
Osmanthus americana
Persea pubescens
Sabal minor
Sabal palmetto
MELIOLA BIDENTATA
Bignonia capreolata
MELIOLA MANCA
Quercus cinerea
Quercus virginiana
MELIOLA MARTINIANA
Persea borbonia
Persea pubescens
MELIOLA NIDULANS
Cornus sp.
MELIOLA PALMICOLA
Sabal palmetto
MELIOLA TENUIS
Arundinaria tecta

METASPHAERIA INFUSCANS
Andropogon virginicus

MICROPERA CAESPITOSA
Ilex verticillata

MICROSPHAERA ALNI
Euonymus atropurpureus
Euonymus sp.
Ligustrum sp.
Quercus coccinea
Syringa vulgaris
Ulmus sp.
Viburnum acerifolium
MICROSPHAERA DENSISSIMA
Quercus velutina

MICROSPHAERA DIFFUSA
Lespedeza striata
Symphoricarpos sp.
MICROSPHAERA ELEVATA
Catalpa speciosa
MICROSPHAERA EUPHORBIAE
Euphorbia corollata
MICROSPHAERA QUERCINA
Quercus alba
Quercus prinoides
MICROSPHAERA RAVENELII
Gleditsia triacanthos
MICROSPHAERA SYMPHORICARPI
Symphoricarpos racemosus

MICROSTROMA JUGLANDIS
Carya alba
Juglans nigra

MOLLISIA DEHNII
Potentilla monspeliensis
MOLLISIA IRIDIS
Iris versicolor

MONILOCHAETES INFUSCANS
Ipomoea batatas

MONOCHAETIA CAMELLIAE
Camellia japonica
MONOCHAETIA DESMAZIERII
Quercus sp.

MONTAGNELLA HELIOPSIDIS
Helianthus divaricatus

MYCOSPHAERELLA FRAGARIAE
Fragaria virginiana
Fragaria sp.
MYCOSPHAERELLA LEUCOTHOES
Leucothoë axillaris
MYCOSPHAERELLA MYRICAE
Myrica cerifera
MYCOSPHAERELLA RUBI
Rubus sp. (Boysenberry)
Rubus sp. (Raspberry)
MYCOSPHAERELLA SENTINA
Pyrus sinensis

MYRIANGIUM CURTISII
Liquidambar styraciflua
MYRIANGIUM DURIAEI
Citrus sp.
Gleditsia triacanthos
MYRIANGIUM TUBERCULANS
Carya illinoensis
Crataegus mollis

MYROTHECIUM RORIDUM
Gossypium hirsutum

NECTRIA ROUSSELLIANA
Buxus sp.

NEMATOSPORA PHASEOLI
Phaseolus lunatus

NIGREDO HYPERICI-FRONDOSI
Hypericum mutilum
NIGREDO LESPEDEZAE-PROCUMBENTIS
Lespedeza repens
Lespedeza violacea
NIGREDO PROMINENS
Euphorbia maculata

NUMMULARIA DISCRETA
Gleditsia triacanthos
Malus sylvestris
NUMMULARIA PUNCTULATA
Quercus sp.

OIDIUM ERYSIPHOIDES var. CROTALARIAE
Crotalaria spectabilis
OIDIUM EUONYMI-JAPONICI
Euonymus japonicus
OIDIUM SP.
Euonymus japonicus

OOSPORA TULIPIFERA
Liriodendron tulipifera

OPHIODOTHIS ATRAMENTOSA
Panicum sp.
Sporobolus indicus

OVULARIA MACLURAE
Maclura pomifera

OVULARIA OBLIQUA
Rumex crispus

PARODIELLA PERISPORIOIDES
Desmodium paniculatum
Desmodium rigidum
Desmodium sp.
Rhynchosia erecta

PENICILLIUM GLADIOLI
Gladiolus sp.

PENIOPHORA AURANTIACA
Alnus rugosa
PENIOPHORA CINEREA
Carpinus caroliniana

PERIDERMIUM CEREBRUM
Pinus taeda

PERONOSPORA ALSINEARUM
Cerastium viscosum
PERONOSPORA ALTA
Plantago major
PERONOSPORA AUSTRALIS
Sicyos angulatus
PERONOSPORA EFFUSA
Chenopodium album
PERONOSPORA EUPHORBIAE
Euphorbia serpyllifolia
PERONOSPORA LAMII
Lamium amplexicaule
PERONOSPORA MANSHURICA
Soja max
PERONOSPORA MYOSOTIDIS
Myosotis macrosperma
PERONOSPORA PARASITICA
Brassica oleracea var. *capitata*
Brassica rapa
Lepidium virginicum
Raphanus sativus
PERONOSPORA POTENTILLAE
Geum canadense
PERONOSPORA SCHLEIDENI
Allium cepa
PERONOSPORA SEYMOURII
Houstonia coerulea

PERONOSPORA VICIAE
Pisum sativum
Vicia sativa

PESTALOZZIA FUNEREA
Smilax laurifolia
PESTALOZZIA GIBBOSA
Vaccinium stamineum
PESTALOZZIA GUEPINI
Camellia japonica
Citrus nobilis
PESTALOZZIA PALMICOLA
Phoenix canariensis
PESTALOZZIA SUFFOCATA
Rosa sp.

PESTALOZZIELLA SUBSESSILIS
Geranium carolinianum

PEZIZELLA LYTHRI
Fragaria sp.

PHAKOPSORA CROTONIS
Croton capitatus
Croton monanthogynus

PHLEOSPORA ANEMONES
Anemone virginiana
PHLEOSPORA ULMI
Ulmus alata
Ulmus americana
Ulmus fulva

PHOMA BRESADOLAE
Cycas revoluta
PHOMA CONCENTRICA
Yucca filamentosa
PHOMA GLUMARUM
Uniola latifolia
PHOMA GRAMINELLA
Bromus secalinus
PHOMA GRAMMA
Stylosanthes biflora
PHOMA INSIDIOSA
Sorghum vulgare
PHOMA LINGAM
Brassica oleracea var. *capitata*

PHOMA OBSCURANS
Fragaria virginiana
PHOMA SP.
Gossypium hirsutum

PHOMOPSIS CITRI
Citrus sp. (Grapefruit)
PHOMOPSIS VEXANS
Solanum melongena

PHRAGMIDIUM IMITANS
Rubus sp. (Raspberry)
PHRAGMIDIUM RUBI-IDAEI
Rubus sp. (Raspberry)
PHRAGMIDIUM SPECIOSUM
Rosa carolina
Rosa virginiana

PHYLLACHORA AMBROSIAE
Ambrosia artemisiifolia
PHYLLACHORA GRAMINIS
Elymus canadensis
Muhlenbergia schreberi
Muhlenbergia sp.
Panicum amarum
Panicum dichotomum
Panicum sp. (Grass)
Paspalum dilatatum
Poa sp.
PHYLLACHORA SCLERIICOLA
Scleria triglomerata

PHYLLACTINIA CORYLEA
Fagus grandifolia
Fagus sylvatica
Ostrya virginiana
Quercus stellata
Zanthoxylum americanum
PHYLLACTINIA SUFFULTA
Ostrya virginiana
Vaccinium stamineum

PHYLLOSTICTA ACERICOLA
Acer rubrum
Acer saccharum
PHYLLOSTICTA AESCULI
Aesculus pavia
PHYLLOSTICTA AMBROSIOIDIS
Chenopodium ambrosioides
PHYLLOSTICTA AMPELOPSIDIS
Parthenocissus quinquefolia
Parthenocissus tricuspidata
PHYLLOSTICTA APOCYNI
Apocynum cannabinum
PHYLLOSTICTA ARGYREA
Elaeagnus sp.
PHYLLOSTICTA ASIMINAE
Asimina triloba
PHYLLOSTICTA AUCUBAE
Aucuba japonica
PHYLLOSTICTA BATATAS
Ipomoea batatas
PHYLLOSTICTA BUMELIAE
Bumelia lycioides
PHYLLOSTICTA CARYAE
Carya illinoensis
PHYLLOSTICTA CATALPAE
Catalpa speciosa
PHYLLOSTICTA CEANOTHI
Ceanothus americanus
PHYLLOSTICTA CONCENTRICA
Hedera helix
PHYLLOSTICTA CONVALLARIAE
Smilacina stellata
PHYLLOSTICTA COOKEI
Magnolia grandiflora
PHYLLOSTICTA CYDONIAE
Cotoneaster sp.
PHYLLOSTICTA EUONYMI
Euonymus sp.
PHYLLOSTICTA GOSSYPINA
Gossypium herbaceum
PHYLLOSTICTA HAMAMELIDIS
Hamamelis virginiana
PHYLLOSTICTA HEDERICOLA
Hedera helix
PHYLLOSTICTA IPOMOEAE
Ipomoea pandurata
PHYLLOSTICTA KALMICOLA
Kalmia latifolia
PHYLLOSTICTA LABRUSCAE
Parthenocissus quinquefolia
Vitis rotundifolia
PHYLLOSTICTA LATIFOLIAE
Kalmia latifolia
PHYLLOSTICTA LIRIODENDRICA
Liriodendron tulipifera

PHYLLOSTICTA MELALEUCA
Ulmus fulva
PHYLLOSTICTA MICROPUNCTA
Persea borbonia
PHYLLOSTICTA MINIMA
Acer rubrum
Acer saccharinum
Acer saccharum
PHYLLOSTICTA NERII
Nerium oleander
PHYLLOSTICTA OPACA
Ilex opaca
PHYLLOSTICTA OVALIFOLII
Ligustrum sp.
PHYLLOSTICTA PAVIAE
Aesculus glabra
PHYLLOSTICTA PHASEOLINA
Phaseolus vulgaris
PHYLLOSTICTA PODOPHYLLI
Podophyllum peltatum
PHYLLOSTICTA PRUNICOLA
Prunus cerasus
PHYLLOSTICTA PTERIDIS
Pteris cretica
PHYLLOSTICTA PYRORUM
Pyrus communis
PHYLLOSTICTA RHEI
Rheum rhaponticum
PHYLLOSTICTA RHOICOLA
Rhus toxicodendron
PHYLLOSTICTA RHYNCHOSIAE
Rhynchosia erecta
PHYLLOSTICTA SEROTINA
Prunus serotina
PHYLLOSTICTA SINUOSA
Osmanthus americana
PHYLLOSTICTA SOLITARIA
Malus sylvestris
PHYLLOSTICTA SPHAEROPSOIDEA
Aesculus glabra
PHYLLOSTICTA TOXICA
Rhus toxicodendron
PHYLLOSTICTA ULMICOLA
Ulmus fulva
PHYLLOSTICTA VACCINII
Vaccinium arboreum
PHYLLOSTICTA VITICOLA
Parthenocissus quinquefolia
Vitis aestivalis
(Phyllosticta viticola)
Vitis rotundifolia
PHYLLOSTICTA SP.
Camellia japonica
Fortunella hindsi
Pittosporum sp.

PHYSALOSPORA CYDONIAE
Malus sylvestris
Pyrus sinensis
PHYSALOSPORA CYNODONTIS
Distichlis spicata
PHYSALOSPORA MALORUM
Malus sylvestris
PHYSALOSPORA OXYSTOMA
Panicum hemitomum

PHYSARUM CINEREUM
Axonopus compressus
Cynodon dactylon
Taraxacum officinale
PHYSARUM PLUMBEUM
Ipomoea batatas

PHYSODERMA ZEAE-MAYDIS
Zea mays

PHYSOPELLA FICI
Ficus carica

PHYSORELLA OBLONGA
Ipomoea batatas

PHYTOMONAS PRUNI
Prunus persica
PHYTOMONAS TABACI
Soja max
PHYTOMONAS VESICATORIA
Lycopersicon esculentum

PHYTOPHTHORA INFESTANS
Lycopersicon esculentum
Solanum tuberosum

PIGGOTIA FRAXINI
Fraxinus americana
Fraxinus pennsylvanica

PILEOLARIA TOXICODENDRI
Rhus toxicodendron

PIRICULARIA GRISEA
Setaria italica

PITYA CUPRESSI
Juniperus chinensis

PLACOSPHAERIA ILICIS
Ilex opaca

PLASMOPARA HALSTEDII
Gnaphalium purpureum

PLASMOPARA VITICOLA
Vitis labrusca
Vitis sp.

PLECTODISCELLA VENETA
Rubus allegheniensis
Rubus idaeus
Rubus trivialis
Rubus sp.

PLENODOMUS DESTRUENS
Ipomoea batatas

PLEOSPORA HERBARUM
Medicago arabica
PLEOSPORA THUEMENIANA
Yucca aloifolia
PLEOSPORA TROPAEOLI
Tropaeolum majus

PODOSPHAERA BINUNCINATA
Hamamelis virginiana
PODOSPHAERA OXYACANTHAE
Crataegus coccinea
Crataegus crus-galli
Malus sylvestris
Prunus cerasus
Prunus sp. (Cherry)

PODOSPORIUM RIGIDUM
Rhus toxicodendron

POLYPORUS BARBATULUS
Juniperus virginiana

POLYPORUS CINNABARINUS
Quercus sp.
POLYPORUS FUMOSUS
Quercus sp.
POLYPORUS GILVUS
Quercus virginiana
POLYPORUS HEMILEUCUS
Carya illinoensis
POLYPORUS HIRSUTUS
Quercus sp.
POLYPORUS SCHWEINITZII
Pinus sp.
POLPYORUS VERSICOLOR
Fagus grandifolia
Liquidambar styraciflua

POLYTHELIS THALICTRI
Thalictrum dioicum

POLYTHRINCIUM TRIFOLII
Trifolium incarnatum
Trifolium reflexum
Trifolium repens
Trifolium sp.

PORIA PUNCTATA
Fraxinus sp.
PORIA RUFA var. LILACINA
Quercus sp.
PORIA VAPORARIA
Alnus rugosa

PROTOCORONOSPORA NIGRICANS
Vicia villosa

PSEUDOMONAS ANDROPOGONI
Sorghum vulgare
PSEUDOMONAS AVENAE
Avena sativa
PSEUDOMONAS CITRI
Citrus sp. (Grapefruit)
PSEUDOMONAS GLYCINEA
Soja max
PSEUDOMONAS MEDICAGINIS var.
PHASEOLICOLA
Phaseolus vulgaris
Pueraria thunbergiana
PSEUDOMONAS MORI
Morus sp.

- PSEUDOMONAS PISI
  - *Pisum sativum* var. *arvense*
- PSEUDOMONAS PRUNI
  - *Prunus persica*

- PSEUDOPERONOSPORA CUBENSIS
  - *Cucumis melo* var. *cantalupensis*
  - *Cucumis sativus*

- PSEUDOPEZIZA MEDICAGINIS
  - *Medicago sativa*

- PUCCINIA ALETRIDIS
  - *Aletris aurea*
- PUCCINIA AMPHIGENA
  - *Calamovilfa longifolia*
- PUCCINIA ANDROPOGONIS
  - *Andropogon furcatus*
  - *Andropogon scoparius*
  - *Penstemon australis*
  - *Penstemon tubiflorus*
- PUCCINIA ANEMONES-VIRGINIANAE
  - *Anemone virginiana*
- PUCCINIA ANGUSTATA
  - *Scirpus cyperinus*
- PUCCINIA ANOMALA
  - *Hordeum vulgare*
- PUCCINIA ANTIRRHINI
  - *Antirrhinum majus*
  - *Antirrhinum* sp.
- PUCCINIA ARENARIAE
  - *Dianthus barbatus*
- PUCCINIA ARGENTATA
  - *Impatiens pallida*
- PUCCINIA ARUNDINARIAE
  - *Arundinaria tecta*
- PUCCINIA ASPARAGI
  - *Asparagus officinalis*
  - *Asparagus verticillatus*
- PUCCINIA ASTERIS
  - *Aster cordifolius*
  - *Solidago canadensis*
- PUCCINIA ASTERUM
  - *Aster cordifolius*
  - *Carex muhlenbergii*
  - *Carex* sp.
  - *Erigeron philadelphicus*
  - *Solidago canadensis*
- PUCCINIA ATROPUNCTA
  - *Xerophyllum asphodeloides*
- PUCCINIA BARDANAE
  - *Arctium minus*
- PUCCINIA BOLLEYANA
  - *Carex frankii*
  - *Sambucus canadensis*
- PUCCINIA CANALICULATA
  - *Cyperus rotundus*
  - *Cyperus strigosus*
- PUCCINIA CARICIS
  - *Ribes odoratum*
- PUCCINIA CHRYSANTHEMI
  - *Chrysanthemum* sp.
- PUCCINIA CICUTAE
  - *Cicuta maculata*
- PUCCINIA CIRCAEAE
  - *Circaea lutetiana*
- PUCCINIA CLEMATIDIS
  - *Triticum aestivum*
- PUCCINIA CNICI
  - *Cirsium lanceolatum*
- PUCCINIA COGNATA
  - *Verbesina virginica*
- PUCCINIA CONOCLINI
  - *Eupatorium coelestinum*
- PUCCINIA CONVOLVULI
  - *Convolvulus sepium*
- PUCCINIA CORONATA
  - *Avena sativa*
  - *Berchemia scandens*
  - *Melica mutica*
- PUCCINIA CYNODONTIS
  - *Cynodon dactylon*
- PUCCINIA CYPERI
  - *Cyperus* sp.
- PUCCINIA DICHONDRAE
  - *Dichondra carolinensis*
- PUCCINIA EATONIAE
  - *Ranunculus abortivus*
  - *Sphenopholis nitida*
  - *Sphenopholis obtusata*
- PUCCINIA EATONIAE var. MYOSOTIDIS
  - *Myosotis macrosperma*
- PUCCINIA ELEOCHARIDIS
  - *Eleocharis obtusa*
  - *Eupatorium rotundifolium*
  - *Eupatorium* sp.

- PUCCINIA ELLISIANA
  - *Andropogon furcatus*
  - *Andropogon scoparius*
- PUCCINIA EMACULATA
  - *Panicum capillare*
- PUCCINIA EXTENSICOLA
  - *Aster cordifolius*
  - *Carex muhlenbergii*
  - *Carex* sp.
  - *Oenothera biennis*
  - *Solidago canadensis*
- PUCCINIA EXTENSICOLA var. ASTERIS
  - *Carex* sp.
  - *Erigeron philadelphicus*
- PUCCINIA EXTENSICOLA var. ERIGERONTIS
  - *Erigeron philadelphicus*
- PUCCINIA EXTENSICOLA var. HIERACIATA
  - *Lactuca canadensis*
- PUCCINIA FRAXINATA
  - *Fraxinus pennsylvanica*
- PUCCINIA GONOLOBI
  - *Vincetoxicum palustre*
- PUCCINIA GRAMINIS
  - *Agrostis alba*
  - *Anthoxanthum aristatum*
  - *Elymus canadensis*
  - *Hordeum jubatum*
  - *Triticum aestivum*
- PUCCINIA GRAMINIS var. AVENAE
  - *Avena sativa*
- PUCCINIA HELIANTHI
  - *Helianthus angustifolius*
  - *Helianthus annuus*
  - *Helianthus atrorubens*
  - *Helianthus divaricatus*
  - *Helianthus hirsutus*
  - *Helianthus mollis*
- PUCCINIA HETEROSPORA
  - *Althaea rosea*
  - *Sida spinosa*
- PUCCINIA HIERACII
  - *Pyrrhopappus carolinianus*
  - *Taraxacum officinale*
- PUCCINIA HYDROCOTYLES
  - *Hydrocotyle umbellata*
- PUCCINIA IRIDIS
  - *Iris* sp.
- PUCCINIA JUSSIAEAE
  - *Jussiaea decurrens*
  - *Ludwigia hirtella*
- PUCCINIA KUHNIAE
  - *Kuhnia eupatorioides*
- PUCCINIA LATERIPES
  - *Ruellia strepens*
- PUCCINIA LEVIS
  - *Paspalum urvillei*
  - *Paspalum* sp.
- PUCCINIA LUDIBUNDA
  - *Carex* sp. (Sedge)
- PUCCINIA MACULOSA
  - *Krigia virginica*
- PUCCINIA MALVACEARUM
  - *Althaea rosea*
- PUCCINIA MAJANTHAE
  - *Uvularia sessilifolia*
- PUCCINIA MARIAE-WILSONI
  - *Claytonia virginica*
- PUCCINIA MELICAE
  - *Melica mutica*
- PUCCINIA MENTHAE
  - *Koellia mutica*
  - *Koellia virginiana*
  - *Monarda fistulosa*
- PUCCINIA MINUTA
  - *Carex* sp.
- PUCCHINIA MUHLENBERGIAE
  - *Muhlenbergia mexicana*
- PUCCINIA OBLIQUA
  - *Vincetoxicum palustre*
- PUCCINIA OXALIDIS
  - *Oxalis violacea*
- PUCCINIA PANICI
  - *Euphorbia marginata*
- PUCCINIA PECKII
  - *Oenothera biennis*
- PUCCINIA PERIDERMICSPORA
  - *Fraxinus pennsylvanica*
  - *Spartina cynosuroides*
  - *Spartina michauxiana*
- PUCCINIA PIMPINELLAE
  - *Chaerophyllum procumbens*
- PUCCINIA PODOPHYLLI
  - *Podophyllum peltatum*
- PUCCINIA POLYGONI-AMPHIBII
  - *Polygonum acre*
  - *Polygonum cristatum*
  - *Polygonum pensylvanicum*

(Puccinia polygoni-amphibii)
- *Polygonum persicaria*
- *Polygonum scandens*
- *Tovara virginiana*

PUCCINIA PRUNI-SPINOSAE
- *Prunus angustifolia*
- *Prunus cerasus*
- *Prunus persica*
- *Prunus simonii*
- *Prunus spinosa*
- *Prunus* sp. (Cherry)
- *Prunus* sp. (Plum)

PUCCINIA PUNCTATA
- *Galium aparine*
- *Galium concinnum*

PUCCINIA PURPUREA
- *Sorghum halepense*
- *Sorghum vulgare*

PUCCINIA PYRRHOPAPPI
- *Pyrrhopappus carolinianus*

PUCCINIA RUBIGO-VERA
- *Impatiens biflora*
- *Impatiens pallida*
- *Secale cereale*

PUCCINIA RUBIGO-VERA var. APOCRYPTA
- *Myosotis macrosperma*

PUCCINIA RUBIGO-VERA var. IMPATIENTIS
- *Impatiens biflora*

PUCCINIA RUBIGO-VERA var. SECALIS
- *Lolium multiflorum*

PUCCINIA RUELLIAE
- *Ruellia strepens*

PUCCINIA SCHEDONNARDI
- *Muhlenbergia mexicana*

PUCCINIA SESSILIS
- *Uvularia sessilifolia*

PUCCINIA SEYMOURIANA
- *Spartina cynosuroides*
- *Spartina michauxiana*

PUCCINIA SILPHII
- *Silphium integrifolium*
- *Silphium perfoliatum*

PUCCINIA SMILACIS
- *Smilax glauca*
- *Smilax* sp.

PUCCINIA SORGHI
- *Oxalis violacea*
- *Zea mays*

PUCCINIA SPEGAZZINII
- *Mikania scandens*

PUCCINIA TARAXACI
- *Taraxacum officinale*

PUCCINIA TENUIS
- *Eupatorium urticaefolium*

PUCCINIA TRIPSACI
- *Tripsacum dactyloides*

PUCCINIA TRITICINA
- *Triticum aestivum*

PUCCINIA TUMIDIPES
- *Lycium halimifolium*

PUCCINIA VERATRI
- *Veratrum viride*

PUCCINIA VERBENICOLA
- *Sporobolus asper*

PUCCINIA VERNONIAE
- *Vernonia fasciculata*

PUCCINIA VEXANS
- *Bouteloua curtipendula*

PUCCINIA VILFAE
- *Sporobolus asper*

PUCCINIA VIOLAE
- *Viola blanda*
- *Viola cucullata*
- *Viola eriocarpa*
- *Viola palmata*
- *Viola* sp.

PUCCINIA VIRGATA
- *Sorghastrum nutans*

PUCCINIA WINDSORIAE
- *Tridens flava*

PUCCINIA XANTHII
- *Xanthium orientale*

PUCCINIASTRUM AGRIMONIAE
- *Agrimonia eupatoria*
- *Agrimonia parviflora*

PUCCINIASTRUM HYDRANGEAE
- *Hydrangea arborescens*

PUCCINIOLA POROSA
- *Vicia americana*

PYRENOPEZIZA MEDICAGINIS
- *Medicago sativa*

PYTHIUM SP.
Phaseolus vulgaris

RAMULARIA AREOLA
Gossypium herbaceum
Gossypium hirsutum
RAMULARIA ARMORACIAE
Roripa armoracia
RAMULARIA ANGUSTATA
Rhododendron viscosum
RAMULARIA CELASTRI
Celastrus scandens
RAMULARIA CIRCUMFUSA
Rumex obtusifolius
RAMULARIA DESMODII
Desmodium canadense
RAMULARIA LACTEA
Viola sp.
RAMULARIA OCCIDENTALIS
Rumex crispus
RAMULARIA PLANTAGINIS
Plantago major
RAMULARIA RANUNCULI
Ranunculus septentrionalis
RAMULARIA SAMBUCINA
Sambucus canadensis
RAMULARIA SUBRUFA
Smilax sp.
RAMULARIA TARAXACI
Taraxacum officinale
RAMULARIA VARIABILIS
Verbascum thapsus
RAMULARIA SP.
Vigna sinensis

RAVENELIA CASSIAECOLA
Chamaecrista multipinnata
RAVENELIA EPIPHYLLA
Tephrosia virginiana

RHIZOCTONIA MICROSCLEROTIA
Aleurites fordii
Ficus carica
Phaseolus vulgaris
Pueraria thunbergiana
Vigna sinensis
RHIZOCTONIA SOLANI
Gossypium hirsutum
Phaseolus vulgaris
Zea mays

RHIZOCTONIA SP.
Pisum sativum

RHIZOPUS NIGRICANS
Ipomoea batatas

RHYSOTHECA GERANII
Geranium carolinianum
RHYSOTHECA OBDUCENS
Impatiens biflora

RHYTISMA ACERINUM
Acer rubrum
Acer saccharinum
RHYTISMA CURTISII
Ilex opaca
RHYTISMA DISCOLORANS
Lyonia ligustrina
RHYTISMA ILICIS-CANADENSIS
Ilex verticillata
RHYTISMA SALICINUM
Salix cordata
Salix nigra
RHYTISMA VACCINII
Vaccinium arboreum
Vaccinium tenellum
Vaccinium virgatum
Vaccinium sp.
RHYTISMA VELATUM
Ilex decidua

ROSENSCHELDIA HELIOPSIDIS
Aster sp.

SACCHAROMYCES SP.
Gladiolus sp.

SCHIZOPHYLLUM COMMUNE
Ulmus americana

SCLEROSPORA GRAMINICOLA
Setaria sp.
SCLEROSPORA MACROSPORA
Avena sativa

SCLEROTINIA CARUNCULOIDES
Morus rubra
SCLEROTINIA FRUCTICOLA
Prunus persica
Prunus serotina

(Sclerotinia fructicola)
Prunus sp. (Plum)
SCLEROTINIA SCLEROTIORUM
Lactuca sativa
SCLEROTINIA TRIFOLIORUM
Trifolium repens
SCLEROTINIA SP.
Rosa sp.

SCLEROTIUM BATATICOLA
Soja max
Vigna sinensis
SCLEROTIUM ROLFSII
Ambrosia trifida
Arachis hypogaea
Capsicum annuum
Capsicum sp.
Cucumis melo
Cucumis sativus
Delphinium sp.
Ipomoea batatas
Iris sp.
Lycopersicon esculentum
Phaseolus lunatus
Phaseolus vulgaris
Saccharum officinarum
Soja max
Solanum melongena
Solanum tuberosum
Syringa vulgaris
Triticum aestivum

SCOLECODOTHIS PINICOLA
Pinus taeda

SCOLECOTRICHUM EUPHORBIAE
Euphorbia maculata
SCOLECOTRICHUM GRAMINIS
Alopecurus geniculatus
Dactylis glomerata
SCOLECOTRICHUM IRIDIS
Iris sp.

SEPTOBASIDIUM PATOUILLARDI
Nyssa sylvatica
SEPTOBASIDIUM PEDICILLATUM
Crataegus mollis
Malus sylvestris
Quercus sp

SEPTOBASIDIUM PSEUDOPEDICELLATUM
Citrus sp.
Malus sylvestris
Prunus persica
SEPTOBASIDIUM RETIFORME
Carya illinoensis
Chaenomeles lagenaria
Malus sylvestris
Prunus americana
Prunus sp. (Plum)
Pyrus communis
Pyrus sinensis
Quercus sp.

SEPTOCYLINDRIUM AREOLA
Gossypium hirsutum

SEPTORIA ANEMONES
Anemone caroliniana
Anemone virginiana
SEPTORIA BACILLIGERA
Ambrosia trifida
SEPTORIA BROMI
Elymus virginicus
Hystrix patula
SEPTORIA BRUNELLAE
Prunella vulgaris
SEPTORIA BUMELIAE
Bumelia lycioides
SEPTORIA CACALIAE
Cacalia atriplicifolia
Cacalia tuberosa
SEPTORIA CAMPANULAE
Campanula americana
SEPTORIA CERASTII
Cerastium viscosum
Cerastium vulgatum
SEPTORIA CHRYSANTHEMELLA
Chrysanthemum sp.
SEPTORIA CIRSII
Cirsium arvense
SEPTORIA CONSPICUA
Steironema ciliatum
SEPTORIA CORNICOLA
Cornus amomum
Cornus sp.
SEPTORIA DIANTHI
Dianthus sp.

SEPTORIA DIERVILLAE
Diervilla sp.
SEPTORIA DIVARICATAE
Phlox sp.
SEPTORIA ERIGERONTIS
Erigeron annuus
SEPTORIA EUPATORII
Eupatorium perfoliatum
SEPTORIA FLAGELLARIS
Convolvulus sepium
SEPTORIA GLADIOLI
Gladiolus sp.
SEPTORIA GLUMARUM
Triticum aestivum
SEPTORIA GLYCINES
Soja max
SEPTORIA HELIANTHI
Helianthus annuus
SEPTORIA HYDRANGEAE
Hydrangea arborescens
Hydrangea sp.
SEPTORIA HYDROCOTYLES
Hydrocotyle sp.
SEPTORIA KALMIAECOLA
Kalmia latifolia
SEPTORIA LACTUCICOLA
Lactuca canadensis
SEPTORIA LEPIDIICOLA
Lepidium virginicum
SEPTORIA LEPTOSTACHYAE
Phryma leptostachya
SEPTORIA LITTOREA
Apocynum cannabinum
SEPTORIA LUDWIGIAE
Ludwigia alternifolia
SEPTORIA LYCOPERSICI
Lycopersicon esculentum
SEPTORIA MIMULI
Mimulus alatus
SEPTORIA NABALI
Prenanthes alba
SEPTORIA NARCISSI
Narcissus sp.
SEPTORIA NEGLECTA
Quercus sp.
SEPTORIA NODORUM
Triticum aestivum
SEPTORIA OENOTHERAE
Oenothera biennis
Oenothera laciniata
SEPTORIA PENTASTEMONIS
Penstemon australis
Penstemon digitalis
SEPTORIA PIRICOLA
Pyrus communis
Pyrus sinensis
SEPTORIA PISI
Pisum sativum
SEPTORIA PODOPHYLLINA
Podophyllum peltatum
SEPTORIA POLYGONORUM
Polygonum hydropiper
Polygonum pensylvanicum
Polygonum persicaria
Polygonum sp.
SEPTORIA RHOINA
Rhus typhina
SEPTORIA RIBIS
Ribes vulgare
SEPTORIA RIPARIA
Carex sp.
SEPTORIA RUBI
Rubus procumbens
Rubus trivialis
SEPTORIA RUDBECKIAE
Rudbeckia triloba
SEPTORIA SACCHARINA
Acer saccharum
SEPTORIA SCROPHULARIAE
Scrophularia marilandica
SEPTORIA SCUTELLARIAE
Scutellaria versicola
SEPTORIA SMILACINAE
Smilacina racemosa
SEPTORIA SPECULARIAE
Specularia perfoliata
SEPTORIA STACHYDIS
Stachys palustris
SEPTORIA SYMPLOCI
Symplocos tinctoria
SEPTORIA TRILLII
Trillium recurvatum
Trillium sp.
SEPTORIA TRITICI
Triticum aestivum
SEPTORIA VALERIANELLAE
Valerianella radiata
SEPTORIA VERBASCICOLA
Verbascum blattaria var. *albiflorum*

SEPTORIA VERBENAE
Verbena hastata
Verbena stricta
SEPTORIA VIOLAE
Viola sp.
SEPTORIA SP.
Ipomoea batatas

SOROSPORIUM CONSANGUINEUM
Andropogon glomeratus
SOROSPORIUM ELLISII
Andropogon scoparius
SOROSPORIUM EVERHARTII
Andropogon scoparius
SOROSPORIUM SYNTHERISMAE
Panicum proliferum
Panicum sp.

SPHACELOMA AMPELINUM
Vitis sp.
SPHACELOMA FAWCETTII
Citrus nobilis var. *unshiu*
SPHACELOMA VIOLAE
Viola sp.
SPHACELOMA SP.
Magnolia grandiflora

SPHACELOTHECA HYDROPIPERIS
Polygonum hydropiper
SPHACELOTHECA ISCHAEMI
Andropogon scoparius
SPHACELOTHECA SORGHI
Sorghum saccharatum
Sorghum vulgare

SPHAERELLA ANNULATA
Magnolia virginiana
SPHAERELLA EARLIANA
Fragaria sp.
SPHAERELLA GLAUCA
Magnolia virginiana

SPHAERONEMA FIMBRIATUM
Ipomoea batatas

SPHAEROPSIS MALORUM
Malus sylvestris

SPHAEROTHECA CASTAGNEI
Prunella vulgaris
SPHAEROTHECA HUMULI
Bidens frondosa
Rosa sp.
SPHAEROTHECA PANNOSA
Rosa sp.

SPOROTRICHUM CITRI
Citrus aurantium
Citrus grandis

STEMONITIS FUSCA
Ipomoea batatas

STEREUM ALBOBADIUM
Fortunella sp.
STEREUM FUSCUM
Liquidambar styraciflua
STEREUM LOBATUM
Nyssa sylvatica
STEREUM OCHRACEOFLAVUM
Alnus sp.
STEREUM RAMEALE
Liquidambar styraciflua

STICTIS ARUNDINACEAE
Andropogon sp.
STICTIS HELICOTRICHA
Arundinaria tecta

STILBOSPORA PINICOLA
Pinus palustris

SYNCHYTRIUM AUREUM
Valerianella radiata
SYNCHYTRIUM DECIPIENS
Amphicarpa bracteata
Amphicarpa pitcheri
Desmodium canescens
SYNCHYTRIUM FULGENS
Oenothera laciniata
SYNCHYTRIUM PLURIANNULATUM
Sanicula canadensis
Sanicula marilandica
SYNCHYTRIUM STELLARIAE
Stellaria media
SYNCHYTRIUM VACCINII
Vaccinium corymbosum

SYSTREMMA ACICOLA
Pinus taeda

TAPHRINA ALNI-INCANAE
Alnus incana
TAPHRINA CERASI
Acer platanoides
TAPHRINA COERULESCENS
Quercus marilandica
Quercus nigra
Quercus sp.
TAPHRINA DEFORMANS
Prunus persica
Prunus serotina
TAPHRINA MIRABILIS
Prunus americana
Prunus angustifolia
TAPHRINA POTENTILLAE
Potentilla canadensis
TAPHRINA PRUNI
Prunus americana
Prunus sp.
TAPHRINA PURPURASCENS
Rhus copallina
TAPHRINA SP.
Prunus sp.
Quercus sp. (Turkey Oak)

THELEPHORA RETIFORMIS
Carya sp.

THIELAVIOPSIS BASICOLA
Gossypium hirsutum

TILLETIA CORONA
Digitaria sanguinalis
Leersia lenticularis
Leersia oryzoides
TILLETIA LEVIS
Triticum aestivum
TILLETIA PULCHERRIMA
Digitaria sanguinalis
TILLETIA TRITICI
Triticum aestivum

TITAEOSPORA ANDROPOGONIS
Sorghum vulgare

TRABUTIA QUERCINA
Quercus laurifolia
Quercus myrtifolia
Quercus nigra
Quercus virginiana

TRANZSCHELIA PRUNI-SPINOSAE
Prunus americana
Prunus cerasus
Prunus persica
Prunus sp. (Apricot)
Prunus sp. (Plum)
TRANZSCHELIA PUNCTATA
Prunus persica

TRICHODOTHIS COMATA
Magnolia grandiflora
Magnolia virginiana

TRIMMATOSTROMA AMERICANUM
Salix sp.

TRYBLIDIUM INSCULPTUM
Carya sp.

TUBERCULARIA FICI
Ficus carica

UNCINULA AUSTRALIANA
Lagerstroemia indica
UNCINULA CIRCINATA
Acer rubrum
UNCINULA CLINTONII
Tilia americana
UNCINULA FLEXUOSA
Aesculus glabra
UNCINULA MACROSPORA
Ulmus alata
Ulmus americana
UNCINULA NECATOR
Parthenocissus quinquefolia
Vitis cordifolia
UNCINULA PARVULA
Celtis occidentalis
UNCINULA POLYCHAETE
Celtis mississippiensis
UNCINULA SALICIS
Populus tremuloides
Salix sp. (Willow)

UREDINOPSIS MACROSPERMA
Pteridium aquilinum

UREDO BIGELOWII
Salix nigra
UREDO MEDUSAE
Populus deltoides
UREDO PTERIDIS
Pteris sp.

UROCYSTIS AGROPYRI
Elymus canadensis

UROMYCES AFFINIS
Hypoxis hirsuta
UROMYCES ANDROPOGONIS
Andropogon virginicus
UROMYCES APPENDICULATUS
Phaseolus vulgaris
UROMYCES ASCLEPIADIS
Asclepias syriaca
UROMYCES CALADII
Arisaema dracontium
UROMYCES CARYOPHYLLINUS
Dianthus sp.
UROMYCES COLORADENSIS
Vicia americana
UROMYCES ELEGANS
Trifolium carolinianum
UROMYCES ERAGROSTIDIS
Agrostis sp.
UROMYCES FALLENS
Trifolium pratense
UROMYCES GRAMINICOLA
Croton monanthogynus
Panicum virgatum
Sebastiana ligustrina
UROMYCES HALSTEDII
Leersia virginica
UROMYCES HEDYSARI-PANICULATI
Desmodium canadense
Desmodium longifolium
Desmodium marilandicum
Desmodium paniculatum
Desmodium rigidum
Desmodium sp.
UROMYCES HORDEI
Hordeum pusillum

UROMYCES HORDEINUS
Hordeum nodosum
UROMYCES HOWEI
Asclepias syriaca
UROMYCES HYPERICI
Ascyrum hypericoides
Hypericum prolificum
UROMYCES LESPEDEZAE-PROCUMBENTIS
Lespedeza capitata
Lespedeza hirta
Lespedeza intermedia
Lespedeza violacea
UROMYCES MINUTUS
Carex complanata
UROMYCES PECKIANUS
Houstonia coerulea
Houstonia purpurea
UROMYCES PERIGYNIUS
Rudbeckia laciniata
UROMYCES PHASEOLI
Strophostyles helvola
Strophostyles pauciflora
UROMYCES PHASEOLI var. TYPICA
Phaseolus lunatus
Phaseolus vulgaris
Phaseolus sp. (Snap Bean)
Strophostyles helvola
UROMYCES PHASEOLI var. VIGNAE
Vigna sinensis
UROMYCES PLUMBARIUS
Gaura angustifolia
Gaura coccinea
Oenothera laciniata
UROMYCES POLYGONI
Polygonum erectum
Polygonum sp. (Knotweed)
UROMYCES PROEMINENS
Euphorbia heterophylla
Euphorbia humistrata
Euphorbia serpyllifolia
Euphorbia sp.
UROMYCES PYRIFORMIS
Acorus calamus
UROMYCES RHYNCHOSPORAE
Rynchospora fascicularis
Rynchospora glomerata
UROMYCES RUDBECKIAE
Rudbeckia laciniata

UROMYCES SOLIDAGINIS
Solidago sp.
UROMYCES SPERMACOCES
Diodia teres
UROMYCES STRIATUS
Medicago sativa
UROMYCES TRIFOLII
Trifolium pratense
Trifolium sp.

UROPHLYCTIS ALFALFAE
Medicago sativa

UROPYXIS AMORPHAE
Amorpha fruticosa

USTILAGO ANOMALA
Polygonum cilinode
USTILAGO AVENAE
Avena sativa
USTILAGO CYNODONTIS
Cynodon dactylon
USTILAGO FIMBRISTYLIS
Fimbristylis autumnalis
USTILAGO HORDEI
Hordeum vulgare
USTILAGO LEVIS
Avena sativa
USTILAGO LONGISSIMA var.
MACROSPORA
Glyceria fluitans
USTILAGO NEGLECTA
Setaria glauca
USTILAGO NUDA
Hordeum vulgare
USTILAGO ORNATA
Leptochloa filiformis
USTILAGO OXALIDIS
Oxalis stricta
USTILAGO PERENNANS
Arrhenatherum elatius
USTILAGO RABENHORSTIANA
Digitaria sanguinalis
USTILAGO SEGETUM
Arrhenatherum elatius
Avena sativa
USTILAGO SHIRAIANA
Phyllostachys sp.
USTILAGO SPARSA
Dactyloctenium aegyptium
USTILAGO STRIAEFORMIS
Phleum pratense
USTILAGO TRITICI
Triticum aestivum
USTILAGO UNIOLAE
Uniola laxa
USTILAGO UTRICULOSA
Polygonum acre
Polygonum hydropiperoides
Polygonum lapathifolium
Polygonum pensylvanicum
USTILAGO ZEAE
Zea mays

VALSA AMBIENS
Ostrya virginiana
VALSA DEUSTA
Carya sp.
VALSA LEUCOSTOMA
Prunus persica
VALSA LUTESCENS
Quercus velutina

VENTURIA INAEQUALIS
Malus sylvestris

VERMICULARIA AFFINIS
Echinochloa crus-galli
VERMICULARIA PHLOGINA
Phlox sp.
VERMICULARIA TRICHELLA
Hedera helix

VERTICILLIUM ALBO-ATRUM
Gossypium hirsutum
VERTICILLIUM BUXI
Buxus sempervirens

VOLUTELLA CARICICOLA
Carex cherokeensis

XANTHOMONAS MALVACEARUM
Gossypium hirsutum
XANTHOMONAS PHASEOLI
Phaseolus vulgaris
XANTHOMONAS PHASEOLI var. SOJENSE
Soja max
XANTHOMONAS PRUNI
Prunus laurocerasus
Prunus persica
Prunus sp. (Plum)

XYLARIA HYPOXYLON
Quercus sp.

ZYTHIA AURANTIACA
Cornus alternifolia

VIRUS DISEASES

ASTER YELLOWS
Erigeron philadelphicus

MOSAIC
Ipomoea batatas
Iris sp.
Phaseolus vulgaris
Saccharum officinarum
Soja max
Vigna sinensis

RUGOSE MOSAIC
Solanum tuberosum

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AGRICULTURAL EXPERIMENT STATION
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THE PLANT DISEASE REPORTER

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THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
AGRICULTURAL RESEARCH ADMINISTRATION
UNITED STATES DEPARTMENT OF AGRICULTURE

SUPPLEMENT 170

SOIL FUMIGATION FOR CONTROL OF NEMATODES AND OTHER SOIL-INHABITING ORGANISMS

GOVERNMENT PUBLICATIONS
JUL 29 1947
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Supplement 170 July 15, 1947

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

PLANT DISEASE REPORTER SUPPLEMENT

Issued by

THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station Beltsville, Maryland

SOIL FUMIGATION FOR CONTROL OF NEMATODES AND OTHER SOIL-INHABITING ORGANISMS

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Plant Disease Reporter
Supplement 170

July 15, 1947

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The purpose of soil fumigation is to control soil-inhabiting organisms that injure the roots of plants or otherwise interfere with the growth of a crop. The practice aims, in some measure, to accomplish below ground what spraying and dusting accomplishes above ground. Soil fumigation is not a recent innovation but has been used, to a limited extent, for many years. Certain factors, especially the high cost of the materials and the difficulty of applying them effectively, have restricted the practice largely to greenhouses, seed beds, and field areas of small size. Fumigating land on a large scale is, for the most part, a recent development and was made possible by the introduction of new fumigants moderate in cost and better suited to large-scale applications.

The most effective chemicals are those that, through volatilization or chemical reaction, give off toxic fumes which diffuse through the soil. Because the fumes diffuse to only a short distance from the point of application, volatile liquids are injected into the soil at closely spaced intervals. Solids usually are applied in powdered or granular form and mixed with the soil mechanically. Chemicals capable of killing such soil-borne organisms as nematodes, fungi, insects, and weed seeds are very likely to injure the roots of plants, hence fumigants are applied before the crop is planted, and an interval must elapse between application and planting to allow time for the chemicals to lose their toxic properties or for the fumes to escape into the air.

CHEMICALS FOR DISINFESTING SOIL

Dichloropropene, Ethylene dibromide, Chloropicrin, and Methyl bromide

The best known and most widely used soil fumigants are composed of or have as the principal active ingredient one of the following chemical compounds: 1,3-dichloropropene, 1,2-dibromoethane (ethylene dibromide), trichloronitromethane (chloropicrin), and bromomethane (methyl bromide).

General characteristics.--Dichloropropene is not available in pure form. The soil fumigant known as "D-D" (see Table 1) is a dark colored volatile liquid said to be a mixture composed of about equal parts 1,3-dichloropropene and 1,2-dichloropropane with small quantities of other chlorinated compounds. "Dowfume N" is of similar composition. Ethylene dibromide is a commercial product used for various purposes and the liquid is available in more or less pure form. As a soil fumigant it is mixed with some diluent to facilitate more accurate application of small dosages. Chloropicrin (tear gas) is a liquid at ordinary temperatures and usually it is applied to the soil without diluting. Methyl bromide, a widely used fumigant, is a gas at ordinary temperatures (boiling point about 40° F.) and for soil fumigation it is mixed with some diluent with a higher boiling point in order that it may be handled and applied as a liquid.

The above mentioned chemical compounds are insoluble, or only slightly soluble, in water, and, when diluted, some organic solvent is used such as naphtha, mineral spirits, or xylene.

Dichloropropene mixtures and ethylene dibromide are the soil fumigants suited to large-scale application. Because chloropicrin and methyl bromide require measures for confining the fumes in the soil, such as placing over the treated area a gas-impervious cover or sprinkling the surface with water, the use of these fumigants is restricted largely to greenhouses and seed beds or field areas of small size where water is available. Methyl bromide requires careful attention to measures for confining the fumes in the soil but it is not highly toxic to plants and mixtures containing this chemical are useful in greenhouses and in other situations where a short interval between application and planting is an important consideration.

Efficacy as nematocides.--For controlling most nematodes, including the root-knot nematode, dichloropropene mixtures, ethylene dibromide, chloropicrin, and methyl bromide are all effective when properly applied. For cyst-forming species, such as the sugar-beet nematode and the golden nematode of potatoes, dichloropropene mixtures have given the best results.

Efficacy as fungicides.--For controlling fungi chloropicrin is by far the most effective. The dichloropropene mixtures are slightly to moderately fungicidal and, at high rates of application, certain of the mixtures containing methyl bromide are reported to be effective against some kinds of fungi.

Efficacy as insecticides.--All the soil fumigants are toxic to many kinds of soil-inhabiting insects. Ethylene dibromide has proven very effective in controlling wireworms and is used extensively for this purpose in certain Pacific Coast regions.

Efficacy as herbicides.--Chloropicrin is the only soil fumigant now in general use that is sufficiently effective in destroying weed seed to be recommended for this purpose. Under certain conditions, presumably where most of the seeds have started to germinate before the fumigant is applied, moderate to heavy applications of the dichloropropene mixtures are reported as giving a considerable degree of weed control.

Table 1. Soil fumigants sold under trade names

Trade names	Principal active ingredient	Amount By volume	Amount By weight	Diluent(s)	Manufacturer
		%	%		
D-D	Dichloropropene	--	--	See text	Shell Chemical Corp.
Dowfume N	do	--	--	See text	Dow Chemical Co.
Dowfume W-40	Ethylene dibromide	--	40	Naphtha	do
Dowfume W-10	do	10	--	do	do
Garden Dowfume	do	5	--	do	do
Iscobrome D	do	10	--	do	Innis, Speiden & Co.
Soilfume 60-40	do	20	42	do	Westvaco Chlorine Products Corp.
Soilfume 80-20	do	10	24	do	do
Bromofume-40	do	--	40	do	Eston Chemicals, Inc.
Bromofume-20	do	--	20	do	do
Bromofume-10	do	--	10	do	do
Larvacide	Chloropicrin	--	--	None	Innis, Speiden & Co.
Dowfume G	Methyl bromide	10	--	Carbon tetrachloride and ethylene dichloride	Dow Chemical Co.
Iscobrome No. 1	do	15	--	Xylene	Innis, Speiden & Co.

Carbon disulfide

Carbon disulfide has been used to a limited extent as a soil fumigant for many years. In this capacity it is slightly to moderately fungicidal and fairly effective against many soil inhabiting insects and most nematodes, but the fumes are exceedingly inflammable and carbon disulfide is being replaced as a soil fumigant by other materials comparable in cost, equally effective, and less hazardous to handle.

Formaldehyde

Water solutions of formaldehyde (formalin or formaldehyde solution) are used to some extent for treating potting soil in small quantities or seed beds of small size. Formaldehyde is effective in controlling many fungi, including those causing "damping off" of seedlings, but it is not very effective against the root-knot nematode. The fumes do not diffuse very freely and formaldehyde in solution is usually mixed with the soil mechanically or applied to the surface as a drench.

Uramon and Cyanamid

Uramon (urea) and cyanamid (calcium cyanamide), two nitrogenous compounds used in the fertilizer trade, are available in powdered or granular form and a combination of the two, when properly applied and mixed with the soil is effective in killing the root-knot nematode, fungi, and weed seed. While perhaps these materials should not be regarded as soil fumigants, they owe their effectiveness, in part at least, to the liberation of ammonia.

Precautions

Most soil fumigants are corrosive to metals, some of them extremely so, and applicators should be emptied and cleaned immediately after use, following the manufacturer's directions.

All fumigants containing methyl bromide should be stored in a cool place. The containers should be full or nearly so and they should be absolutely tight, otherwise the methyl bromide will escape as a gas, leaving only the diluent.

Fumigants containing naphtha as a diluent are inflammable mixtures and precautions should be taken to avoid igniting the fumes by fire or sparks. Dichloropropene mixtures (i.e., "D-D" and "Dowfume N") and mixtures where xylene is used as a diluent (i.e., "Iscobrome No. 1") are inflammable but the fumes are not easily ignited. The fumes from chloropicrin and "Dowfume G" are not inflammable.

All soil fumigants are toxic to humans and animals, at least to some degree, but none are dangerous to the operator when properly handled.

The manufacturer's directions will provide information regarding any special precautions that should be taken when handling particular fumigants. The following precautions should be taken with all soil fumigants:

1. Avoid prolonged breathing of the fumes even though they may not be irritating or have a pronounced or distinctive odor.

2. Do not allow the liquids to remain in contact with the skin. Wash off promptly with soap and water and leave the exposed area open to the air for a short time.

3. If the liquids are spilled on clothing, remove the garment, including shoes or gloves, without delay. Usually it is not advisable to wear gloves.

4. Never, under any circumstances, take the risk of getting the liquids into the eyes or mouth.

The Cost of Soil Fumigants and Where They may be Obtained

Mixtures containing dichloropropene and those containing ethylene dibromide are the least expensive of the soil fumigants now in general use. In quantities of from 1 to 50 gallons, D-D, for example, costs from about $1.60 to about $6.00 per gallon (16 to 60 cents per pound), depending on the amount purchased. Mixtures containing ethylene dibromide are more or less comparable to D-D in cost, the price varying with the amount of ethylene dibromide contained in the different mixtures and with the diluent used. The cost of mixtures containing methyl bromide is usually somewhat higher than of those containing ethylene dibromide. Chloropicrin is the most expensive, the cost, in quantities of from 1 to 50 gallons supplied in cylinders, varying from about $11.00 to about $14.00 per gallon (80 cents to $1.00 per pound.)

When supplied in quantities for large-scale application the price of most soil fumigants is lower than the minimum figures given above. Most large-scale applications are made on a custom basis at a per acre cost ranging from about $30.00 to $50.00, the price varying with the fumigant used and the size of the area.

In many parts of the country soil fumigants may be obtained through the manufacturer's agents or local representatives and disbributors. In regions where soil fumigation has become a common practice, soil fumigants are stocked by some of the retail seed stores. Where such service is not available the materials may be obtained direct from the manufacturers. The agencies from which soil fumigants are purchased may sell applicators also or, in any event, they should be able to provide information as to where such equipment may be obtained.

Companies that manufacture or market the soil fumigants listed in Table 1

Innis, Speiden & Co., 117 Liberty St., New York 6, N. Y.
Shell Chemical Co., 100 Bush St., San Francisco 6, Calif.
Dow Chemical Co., Midland, Mich.
Westvaco Chlorine Products Corp., 405 Lexington Ave.,
New York, 17, N. Y.
Eston Chemicals, Inc., 3100 East 26th St., Los Angeles 23,
Calif.

Companies that manufacture or market hand applicators

Innis, Speiden & Co., 117 Liberty St., New York 6, N. Y.
Mack's Anti-weed Gun, 823 Chicago St., Caldwell, Idaho
Hartsville Chemical Co., Hartsville, S. C.

The above lists are not necessarily complete. They are furnished for the information of the reader with the understanding that no discrimination is intended and no guarantee implied either with respect to the reliability of the companies or the quality of their products.

FUMIGATING COMPOST AND POTTING SOIL

Using Chloropicrin, Methyl bromide, Ethylene dibromide, or Dichloropropene Mixtures

The soil should be finely pulverized and fairly moist with the moisture evenly distributed. Fumigants will not give the best results when soil is on the dry side. The most effective procedure is to place the soil in a tight container which should be full, with no air space between the top of the soil and the cover. The next best arrangement is to have the soil in a bin with tight bottom and sides. After the fumigant is applied the exposed top surface is sprinkled with water and covered with some suitable material (see page 182). Soil can be treated in open piles with fairly satisfactory results but the fumigant will not be quite so effective, especially against organisms that are difficult to kill such as certain fungi and weed seeds, as when the soil is more tightly enclosed.

Small quantities of compost or potting soil can be treated without special equipment for applying the fumigant but for larger quantities in bins or open piles a hand-operated applicator of the spot-injection type (see page 179) will be needed.

Fumigating in closed containers.--The following is suggested as a procedure that may be followed when soil is fumigated in a container.

We will assume that the container to be used is a steel drum, open at one end, about 21 or 22 inches in diameter, and 3 feet long. A drum of these dimensions holds about 7-1/2 cubic feet of soil or slightly more than 6 bushels. Set the drum on end and place soil in the bottom to a depth of 6 inches. Pour over the surface of the soil, distributing it in several evenly spaced spots, 20 cubic centimeters (about 1-1/2 tablespoonfuls) of the fumigant and immediately place over this an additional 12 inches of soil. Make another application and repeat until the drum is full. This will require 3 applications and the last will be about 6 inches from the top. Level off the surface, sprinkle with water, and cover to make the top as nearly gas-tight as possible. The above rates of application should be adequate for chloropicrin, dichloropropene mixtures, fumigants containing 10 to 15 percent by volume of methyl bromide, and those containing 10 percent by volume of ethylene dibromide. If the operation is carried on in the open, if a breeze is blowing, and if the operator works on the windward side, chloropicrin can be applied in this manner without undue physical discomfort. When using chloropicrin it is advisable to measure dosages in advance, placing each in a corked vial, or to pour from a Larvacide dispenser bottle regulating the dosages by the graduations on the label.

Fumigating in bins or open piles.--The following is suggested as a procedure that may be followed when soil is fumigated in bins or open piles. The pile should be rectangular in shape, flat on top, and with the sides at a steep even slant. The spacing of injection points and the rate of application can be regulated more conveniently if the depth of the soil in the bin or pile is about 1 foot or some multiple thereof. Mark the top surface of the soil lengthwise and crosswise with marks 10 inches apart and stagger the injections (see diagram, page 180). Apply chloropicrin, dichloropropene mixtures, or fumigants containing 10 percent by volume of ethylene dibromide at the rate of 3 cubic centimeters (about 1 teaspoonful) per injection: apply fumigants containing from 10 to 15 percent by volume of methyl bromide at the rate of 6 to 8 cubic centimeters (about 1-1/4 to 1-1/2 teaspoonfuls) per injection. When the soil in the bin or pile is 1 foot deep, inject the fumigant to a depth of 6 inches, when the soil is 2 feet deep make one set of injections to a depth of 18 inches and another set to a depth of 6 inches. If an applicator with a long soil probe is not available, make the first set of injections before the upper 12-inch layer is added. When the soil is in an open pile make additional injections at the sides, inserting the probe of the applicator obliquely to a depth of 6 inches. Smooth the exposed surfaces with a hand rake, sprinkle thoroughly, and cover with the most suitable material available (see page 182).

Using Formaldehyde

Formaldehyde is suitable for treating compost and potting soil in small quantities and it is effective in controlling many fungi, including those causing "damping off" of seedlings, but it is not sufficiently effective in controlling the root-knot nematode to be recommended for this purpose.

Mix 1 part of commercial formalin or formaldehyde solution with 5 or 6 parts of water and sprinkle 30 cubic centimeters (about 2-1/2 tablespoonfuls) of this dilution over, and thoroughly mix it with, each bushel of soil. If the soil is then spread in thin layers (3 inches deep or less) or placed in shallow flats, seed may be planted 24 hours after treatment. Heavy soils should be lightened before treating by adding organic matter, otherwise the seeds or seedlings may be injured. Formaldehyde can be applied also as a dust and several formaldehyde dusts are on the market. The dust is mixed with the soil according to directions on the container, after which the soil should be thoroughly watered. Seed may be sown immediately but at least 3 days should elapse before cuttings or transplants are set.

Formaldehyde gas is toxic to plants and the fumes, in any appreciable concentration, should not be allowed to escape into a greenhouse where plants are growing.

Aeration

In most instances fumigated soil must be aerated before it is safe to use for sowing seed or setting transplants. The rate at which aeration takes place depends on so many different factors that it is impossible to be definite about the time required. Aeration is fastest in dry soil and at high temperatures and it can always be hastened by stirring the soil or spreading it out to increase the surface exposed to the air. When methyl bromide is used the ordinary procedure of handling the soil will provide all the aeration necessary. Soil treated with chloropicrin should not be used as long as any odor of the fumigant can be detected. When a dichloropropene mixture has been employed it is not necessary to wait until all odor of the fumigant has disappeared but it is safer to wait until the odor is faint, especially if the soil is to be used for transplants.

Soil fumigated with chloropicrin must not be moved into a greenhouse where plants are growing until aeration is complete. Soil treated with fumigants containing methyl bromide or with those containing dichloropropene can be moved from the bin or pile directly to a greenhouse and placed on benches or in flats without previous aeration and without endangering plants growing in the same house. Presumably the same can be said of soil fumigated with ethylene dibromide though little information is available on this point.

FUMIGATING GREENHOUSE BEDS, SEED BEDS, AND FIELD AREAS OF SMALL SIZE

Application Equipment

Seed beds, flower beds, and other small outdoor areas not exceeding a few hundred square feet can be treated without special equipment by punching holes in the soil and pouring in measured quantities of the fumigant. This procedure is suggested for use in the open, not in greenhouses or other enclosures, and it is not recommended as a method for applying chloropicrin in any situation. For treating larger areas or for applying fumigants in greenouses, an applicator will be needed.

Spot-injection applicators resemble huge hypodermic needles and inject small quantities of the fumigant into the soil at spots. Several hand applicators of this type are on the market and they are suitable for treating small areas. Continuous-flow applicators inject the fumigant into the soil in one or more continuous subsurface streams. Small-sized applicators of this type are not yet generally available but at least one kind, delivering two parallel streams simultaneously, has been manufactured and sold in limited numbers. Such applicators require more motive power than that provided by one operator. They can be pulled by additional operators, by a draft animal, or by a small tractor. Power-driven applicators of similar design, suitable for use in large greenhouses or for treating field areas of moderate size, have been built and used experimentally (see page 176).

Preparing the Soil

The soil is prepared in the same manner as for planting a crop. It should be moderately loose and reasonably free from clods, lumps, and undecomposed crop residues. Roots of the preceding crop should be removed or allowed time to decay. If barnyard manure or compost is to be mixed with the soil this should be done before the fumigant is applied. When a rotary tiller is used the land should be prepared a few days in advance to allow time for the soil to settle. Fumigants perform best in soil that is fairly moist. Results will be unsatisfactory when fumigants are applied to dry soil. Except under wet conditions, moderate rain following application is beneficial. The temperature of the soil should be above 40° F., preferably between 60° and 85° F.

Applying the Fumigant

The fumigant should be placed about 6 inches below the surface of the soil. Where application is by spot injections, mark the area lengthwise and crosswise forming small squares like a checkerboard. Starting at one side, make injections along the first mark at the

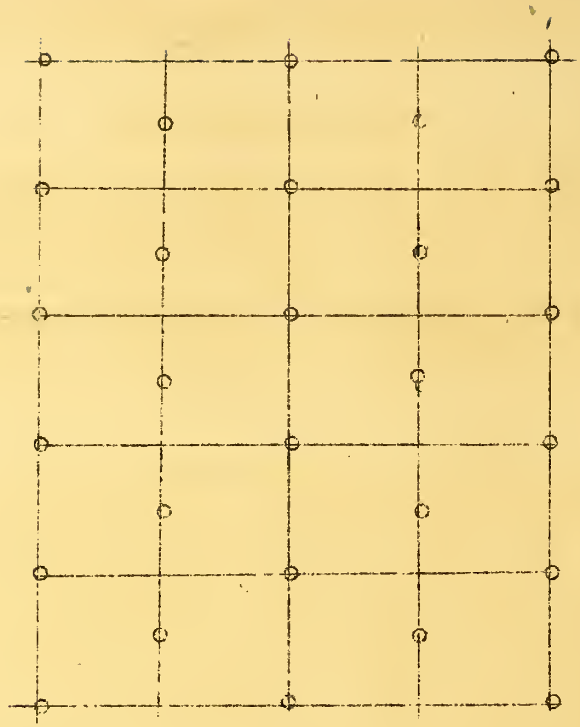

Diagram showing arragnement of application points

points where the cross marks intersect, along the second mark midway between where the cross marks intersect, etc. (see diagram). Staggering the injections in this manner aids in giving the greatest possible coverage. In the following discussion, figures designating the spacing of injections refer both to the distance between rows of injection points and the distance between injection points in the row.

Proper spacing between injections depends on the kind of fumigant, the organisms to be controlled, and the kind of soil. In general better coverage is obtained when a given rate per unit area is applied in small dosages closely spaced than when the same rate is applied in larger dosages more widely spaced.

When fumigating seed beds and similar small areas, a high degree of control, often of a variety of different organisms, is likely to be more important than the cost of the fumigant. The following rates of application therefore are somewhat higher than those usually employed for large-scale applications. The rates are based primarily on requirements for controlling the root-knot nematode but they should be adequate for most of the organisms against which the particular fumigants are effective and for all except very heavy clay soils. The amounts per injection may be decreased slightly for light sandy soils.

When fumigating very heavy clay soils, decrease the spacing between injection points by about 2 inches without decreasing the amounts per injection.

Fumigants should not be applied to the area occupied by the root systems of living plants. One can estimate about how close to such plants it is safe to apply fumigants by remembering that, when injected at the rates ordinarily used, the fumes will diffuse through the soil to a distance of not more than about 10 inches.

Dichloropropene mixtures.--Space injections 12 inches apart and apply 4 to 5 cubic centimeters (about 3/4 to 1 teaspoonful) per injection. This is equivalent to 46 to 57 gallons per acre.

Ethylene dibromide.--When using mixtures containing 10 percent by volume (about 20 percent by weight) of ethylene dibromide, space injections 12 inches apart and apply 5 to 6 cubic centimeters (about 1 to 1-1/4 teaspoonfuls) per injection. This is equivalent to 57 to 69 gallons per acre. When controlling wireworms is the only objective apply 3 cubic centimeters (about 1/2 teaspoonful) per injection. This is equivalent to 34 gallons per acre. Use twice the above amounts when applying mixtures containing 5 percent by volume (about 10 percent by weight) of ethylene dibromide and half these amounts when applying mixtures containing 20 percent by volume (about 40 percent by weight) of ethylene dibromide.

Chloropicrin.--Space injections 10 inches apart and apply 2.5 to 3 cubic centimeters (about 1/2 teaspoonful) per injection. This is equivalent to 41 to 50 gallons per acre.

Methyl bromide.--When using mixtures containing 10 to 15 percent by volume of methyl bromide, space injections 10 inches apart and apply 5 to 6 cubic centimeters (about 1 to 1-1/4 teaspoonfuls) per injection. This is equivalent to 82 to 99 gallons per acre. (Applications of 7 to 8 cubic centimeters per injection are reported to be effective in controlling some kinds of fungi.)

Formaldehyde.--Small areas may be treated by applying formaldehyde as a drench. To 1 part commercial formalin or formaldehyde solution add 50 parts of water and apply 1/2 to 1 gallon of this dilution to each square foot of soil. The treated area should be covered for 2 days with some material that will help confine the fumes (see following section). This treatment is reported effective for controlling many kinds of fungi but it is not effective against the root-knot nematode.

Procedure following Application

After the fumigant has been injected (except where formaldehyde is used as a drench) the area should be made as flat and smooth as possible. Small areas can be smoothed with a hand rake. For most soils rolling is beneficial.

If chloropicrin or methyl bromide was used, sprinkle with water, after smoothing the soil, wetting the surface to a depth of an inch or more. This so-called "water seal" should be applied promptly; if delayed for as long as 2 hours after the fumigant is injected much of the gas will escape. Dichloropropene mixtures and ethylene dibromide do not ordinarily require a "water seal" but under hot, dry conditions or where there is a surface layer of dry soil the action of any fumigant will be improved by sprinkling.

When using chloropicrin or methyl bromide in seed beds and other small areas where a high degree of sterilization is desirable, the area should be sprinkled and then covered with some suitable material. Specially treated tarpaulins and glue-coated craft paper have the advantage of being comparatively gas tight. Light weight roofing paper can be used to advantage over long narrow seed beds. Untreated canvas, cloth sacks, paper, peat moss, etc., serve to retard evaporation and hold the moisture at the surface of the soil. Any covering material that will absorb water should be sprinkled after it is applied.

The soil should remain undisturbed (and the covering, when one is used, should remain in place) for at least 2 days after applying chloropicrin or methyl bromide and at least 4 days after applying ethylene dibromide or a dichloropropene mixture.

Interval between Application and Planting

The interval that must elapse after a fumigant has been injected and before it is safe to plant a crop is exceedingly variable and depends on many factors such as the fumigant used, the rate of application, the kind of soil, the condition of the soil (especially temperature and water content), and the crop to be planted. For most soils of moderate moisture, where soil temperature is not below 60° F., and where the rate of application is not exceptionally high, the interval for methyl bromide is 2 to 3 days, for chloropicrin and ethylene dibromide 1 to 2 weeks, for dichloropropene mixtures 2 to 3 weeks (see also page 183). If the fumigant has a fairly pronounced odor, an indication of the amount of gas remaining can be obtained by smelling a handful of soil secured 6 inches or so below the surface. The area should not be planted as long as any odor of formaldehyde or of chloropicrin remains. With dichloropropene mixtures it is not necessary to wait until all odor of the fumigant has disappeared but to be on the safe side one should wait until the odor is faint especially if the land is to be used for transplants. Aeration can be hastened by tillage for which purpose a rotary tiller is well adapted. When conditions permit, land should be treated the preceding autumn for crops that must be planted in early spring.

Fumigating Greenhouse Benches

Raised benches in greenhouses are treated in the same manner as ground beds and other small areas and with about the same or slightly heavier rates of application (see page 181). Except where formadehyde is applied as a drench, the soil should be moderately moist throughout with no dry corners or pockets. If the soil has become dry, wet thoroughly and allow time for excess water to drain away. Inject the fumigant to a depth equal to about half the depth of the soil in the bench, smooth and firm the surface, sprinkle with water, and cover with some suitable material (see page 182).

Chloropicrin and methyl bromide are commonly used for fumigating greenhouse benches. Except for the possible objection that a somewhat longer interval may be required between application and planting, there appears to be no reason why ethylene dibromide and the dichloropropene mixtures should not be suitable for this purpose.

When using chloropicrin or formaldehyde all plants growing in the same section must be removed and partitions between this and adjoining sections sealed. During warm weather when the ventilators can remain open, dichloropropene mixtures can be applied to soil in greenhouses without much danger of injuring plants growing in the same section, and methyl bromide can be applied with even less danger. Not much information is available about the use of ethylene dibromide in greenhouses but probably no greater risks will be involved than with the dichloropropene mixtures.

Treating Seed Beds with Uramon and Cyanamid

A mixture of 2 parts uramon and one part cyanamid is effective for destroying weed seeds and controlling the root-knot nematode and fungi in seed beds. Plow and disk or spade and rake the area to be treated. Apply the chemicals at the rate of one pound uramon and one-half pound cyanamid (1-1/2 pounds of the mixture) to each square yard of area. Broadcast about two-thirds of the required amount evenly over the surface and work in to a depth of 4 to 6 inches, mixing the chemicals thoroughly with the soil. Broadcast the remaining one-third and work into the surface lightly with a hand rake. The chemicals should be applied at least 60 days, preferably 90 days, before seed is sown. In most instances this means preparing the land and applying the chemicals the preceding autumn. Both uramon and cyanamid contain nitrogen hence little or no nitrogen need be applied as fertilizer when the treated area is planted. This method was developed primarily for treating tobacco plant beds and it is suited to the light sandy loam soils of the eastern coastal plain region. The ammonia liberated by the chemicals may have an undesirable effect on the physical properties of heavy soils.

Fumigating Hill and Planting Sites

Annual crops grown in widely spaced hills such as watermelons, trees such as peaches and figs, and ornamental shrubs such as gardenias, can be protected against root-knot-nematode injury, at least during early stages of growth, by fumigating the planting sites. This practice has been tested experimentally at Tifton, Georgia, and the following suggestions are based on procedures and rates of application that gave good results in the Norfolk sandy loam soils of the Tifton region.

For watermelons, locate and mark the position of each hill, make one injection of the fumigant at each of these spots, and, after a week or two, plant the seed at the place where the fumigant was applied. A dichloropropene mixture or chloropicrin applied at the rate of 2 to 3 cubic centimeters per injection, or a fumigant containing 15 percent methyl bromide applied at the rate of 30 cubic centimeters per injection, gave satisfactory results at Tifton. Unless the fumigant is held in the soil by rains following application, an interval of 2 weeks between application and planting is adequate for a dichloropropene mixture and an interval of 1 week for chloropicrin or methyl bromide. Chloropicrin and methyl bromide have the disadvantage that an area about 2 feet in diameter, centering on the point of injection, must be sprinkled with water immediately after injecting the fumigant.

For trees such as peaches and figs, the fumigant is applied to a circular area about 6 feet in diameter following the same procedure as for any other small-scale field application (see page 179, 180). After an interval of 2 to 3 weeks a tree is set in the center of each treated area, care being taken that soil returned to the hole and placed around the roots be from the treated, not from the surrounding untreated, area. A dichloropropene mixture applied with a spot-injection applicator at the rate of 3 cubic centimeters per injection, with injections spaced 17 inches apart, gave good results at Tifton. Closer spacing probably would be advisable in heavier soils. The Tifton experiments did not include ethylene dibromide but there is no reason to believe that this fumigant would not have given good results. Applying the fumigant with a power-driven applicator to strips about 6 feet wide, the strips being so spaced that a row of trees will be set through the middle of each, seems to be a logical procedure when setting large orchards.

Precautions to Avoid Recontamination of Treated Areas

Treated areas may become recontaminated in various ways depending on the conditions and the disease organisms involved. When treatment is for control of such microscopic organisms as nematodes and fungi, garden tools and other tillage implements, if previously used on infested land, should be cleaned before using on treated areas. Attention should be given also to the possibility of transporting infested soil on shoes or on the feet of work animals, especially during wet weather. Trenches around seed beds and similar outdoor areas may prevent water from washing over them during heavy rains, a precaution that is quite important, in some situations, when soil is treated in autumn. Where transplants, bulbs, tubers, etc., are used, soil treatment may be of little avail if planting stock is infected.

Table 2. Conversion of measurements

1 teaspoon	equals	approx.	5	cubic centimeters	
1 tablespoon	"	"	15	" "	
1 cup	"	"	237	" "	; 1/2 pint
1 fluid ounce	"		29.6	cubic centimeters	
1 pint	"		473.2	" "	
1 quart	"		946.3	" "	
1 gallon (U. S.)	"		3785.4	" "	

Table 3. Relationship between the weight and volume of six commonly used soil fumigants

Fumigant	Cubic centimeters per pound	Pounds per gallon
Larvacide	273	14
D-D	378	10
Dowfume N	378	10
Dowfume W-10	522	7.25
Dowfume G	344	11.3
Iscobrome No. 1	456	8.3

Table 4. Amounts of fumigant in cubic centimeters required to treat an area of 100 square feet

Spacing of injections	Cubic centimeters per injection									
	1	2	3	4	5	6	7	8	9	10
inches										
8	225	450	675	900	1125	1350	1575	1800	2025	2250
10	144	288	433	577	721	856	1009	1150	1298	1442
12	100	200	300	400	500	600	700	800	900	1000
14	73	147	220	294	367	441	514	588	661	734
16	56	112	169	225	281	337	393	450	506	562

Table 5. Amounts of fumigants in gallons required to treat one acre.

Spacing of injections	Cubic centimeters per injection									
	1	2	3	4	5	6	7	8	9	10
inches										
8	23.3	46.5	69.8	93.0	116.3	139.5	162.8	186.0	209.3	232.5
10	16.6	33.1	49.7	66.3	82.8	99.4	116.0	132.6	149.1	162.7
12	11.5	23.0	34.5	46.0	57.6	69.0	80.6	92.1	103.6	115.1
14	8.4	16.9	25.4	33.8	42.3	50.7	59.2	67.6	76.1	84.5
16	6.5	13.0	19.9	25.9	32.4	38.8	45.3	51.8	58.2	64.7

LARGE-SCALE SOIL FUMIGATION

Soil fumigation has become a regular practice in the pineapple fields of Hawaii and is becoming so in California and other western States where many thousands of acres are treated annually. Dichloropropene mixtures and ethylene dibromide are the fumigants used and a greater part of this area is treated primarily for controlling one or the other or a combination of two major pests: the root-knot nematode and wireworms. The practice appears to be coming into use in Florida but as yet on a more moderate scale. In connection with their program for controlling the golden nematode of potatoes, the State of New York, in cooperation with the U. S. Department of Agriculture, fumigated about 1500 acres on Long Island during 1946, using a dichloropropene mixture.

Application Equipment

Large-scale applications are made with power-driven applicators of the continuous-flow type that deliver into the soil from 6 to 10 streams simultaneously or with attachments to plows that place the chemical in the bottom of the furrow just in front of the moldboard where it is immediately covered. Applicators consist of a tank to hold the fumigant and a system of tubes to convey it into the soil, the tubes passing down the back edge of narrow cultivator teeth sometimes referred to as chisels. One or more pumps are included in the mechanism and the liquid is delivered under pressure. The chisels are mounted on a horizontal bar or framework capable of being raised and lowered. In some types of applicators the tank, chisels, and delivering mechanism are mounted directly on a tractor while in other types they are carried on a separate vehicle that operates as a trailer.

Applying fumigants on a large scale is usually done on a custom basis by individuals or companies owning power equipment and anyone interested in large-scale operations should make contact with representatives of the companies that produce dichloropropene or ethylene dibromide products.

Preparing the Land

The land should be plowed and harrowed to the consistency of a good seed bed. Disking alone will not work the soil to a sufficient depth. The land should be reasonably free from clods, undecomposed crop residues, and other trash, as such materials create air pockets in the soil that prevent proper diffusion of the gases and collect on the applicator chisels, causing furrows that are not easily filled. The soil should be at least moderately moist though not excessively wet. Land that is in a tillable condition is not too wet to treat. The temperature of the soil should be above 40° F., temperatures between

60° and 85° F. being optimum.

Applying the Fumigant

For most large-scale operations the cost of the fumigant is an important consideration. Unless the crop has a high cash value the rate of application cannot greatly exceed the minimum required to prevent the pests involved from appreciably reducing yield. The rate varies with the fumigant used, the pests to be controlled, and the type and condition of the soil. Against wireworms, 20 gallons per acre of a fumigant containing 10 percent ethylene dibromide by volume are reported as usually giving good results. For controlling the root-knot nematode, 30 gallons of a fumigant containing 10 percent ethylene dibromide or 20 gallons of dichloropropene mixture per acre are the minimum rates usually recommended. For special conditions, where a high degree of control is needed and where crop values justify the expense, applications up to 40 gallons per acre of either a 10 percent ethylene dibromide mixture or of a dichloropropene mixture may be desirable. The dichloropropene mixtures are recommended for cyst-forming species such as the sugar-beet nematode and the golden nematode of potatoes and for these two pests a somewhat higher rate is needed than that used against root-knot. Fall applications of a dichloropropene mixture at the rate of 45 gallons per acre gave good control of the golden nematode of potatoes on Long Island, New York.

For best results the chisels on the applicator should not be spaced farther than 12 inches apart and the fumigant should be injected at a depth of from 6 to 8 inches. Because openings left by the chisels should be filled promptly, a drag or roller is sometimes attached to the applicator. The soil should be left flat, smooth, and compact at the surface and whatever operations are needed to bring the land into this condition should be done promptly after application. When the fumigant is applied by means of an attachment to a plow, harrowing and smoothing must not be long delayed.

Interval between Application and Planting

As already explained (page 182) the interval that must elapse between application and planting varies considerably, depending on the rate of application, the kind and condition of the soil, and other factors. The following intervals are suggested as adequate for average conditions in the Atlantic Coastal Plain region and in the southwestern States where most of our information on the matter has been obtained. With conditions especially favorable for rapid escape of the fumes, such as sandy soil, dry soil, and high soil temperatures, somewhat shorter intervals may be sufficient while with conditions unfavorable, such as heavy soil, wet soil, and low soil temperature, considerably longer intervals may be necessary. Where conditions in autumn permit, it is recommended that applications be made at this time for crops that must be planted in early spring.

Dichloropropene mixtures.--In the southeastern States the interval varies from about 14 days for 20-gallon-per-acre applications to about 30 days for 50-gallon-per-acre applications; in the southwestern States from 8 to 10 days for 20-gallon-per-acre applications to 20 to 25 days for 50-gallon-per-acre applications.

Fumigants containing 10 percent by volume of ethylene dibromide. --In the southeastern States the inverval varies from about 8 days for 20-gallon-per-acre applications to 18 days for 50-gallon-per-acre applications; in the southwestern States from about 6 days for 20-gallon-per-acre applications to about 12 days for 50-gallon-per-acre applications.

DIVISION OF NEMATOLOGY, BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, AGRICULTURAL RESEARCH ADMINISTRATION, U. S. DEPARTMENT OF AGRICULTURE

A77.511 :171

THE PLANT DISEASE REPORTER

Issued By

THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
AGRICULTURAL RESEARCH ADMINISTRATION
UNITED STATES DEPARTMENT OF AGRICULTURE

SUPPLEMENT 171

TOMATO LATE BLIGHT IN THE WARNING SERVICE AREA IN 1947

Supplement 171 December 15, 1947

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

PLANT DISEASE REPORTER SUPPLEMENT

Issued by

THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station — Beltsville, Maryland
Supplement 171 — December 15, 1947

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TOMATO LATE BLIGHT IN THE WARNING SERVICE AREA IN 1947

Plant Disease Reporter
Supplement 171

December 15, 1947

FOREWORD

Paul R. Miller and Jessie I. Wood

The Late Blight Warning Service

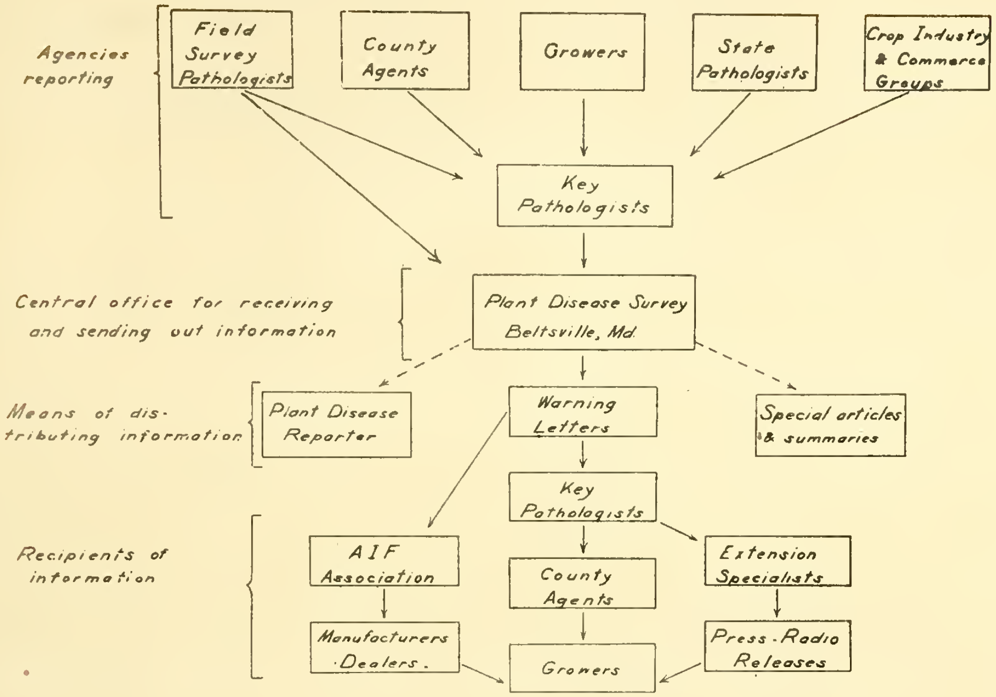
Last year's unprecedented outbreak of tomato late blight (Phytophthora infestans) in the eastern part of the country (PDR Supplements 164, 165. 1946) led to the establishment of the late blight warning service described in the Reporter (PDR 31: 140-143. Apr. 15, 1947). As shown graphically on the accompanying chart, the service operates primarily through key pathologists designated to work with it in each cooperating State and in Canada.

This report is concerned with the development of tomato late blight in 1947 in the area included in the warning service, i. e., the States east of the Mississippi River, and Minnesota, Iowa, Missouri, Arkansas, Louisiana, and Texas, and Provinces of Canada as far west as Manitoba.

Acknowledgment

The Plant Disease Survey takes this opportunity to express its appreciation to persons and organizations concerned in the activity of the late blight warning service. The individual State Key Pathologists are the mainstay of the service and the major part of the credit for effective operation belongs to them. Dr. S. P. Doolittle of the U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering contributed much time and effort on constructive ideas and helpful criticism. Dr. C. H. Mahoney of the National Canners' Association, Dr. R. J. Haskell of the U. S. Extension Service, and Mr. H. P. Barss of the U. S. Office of Experiment Stations encouraged and supported the establishment of the warning service. The cooperation of the Agricultural Insecticide and Fungicide Association, through Mr. Lea S. Hitchner, insured proper allocation of control chemicals.

Reporting Service
as conducted by
The Plant Disease Survey


Agencies reporting
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County Agents
Growers
State Pathologists
Crop Industry & Commerce Groups
Key Pathologists
Central office for receiving and sending out information
Plant Disease Survey Beltsville, Md.
Means of distributing information
Plant Disease Reporter
Warning Letters
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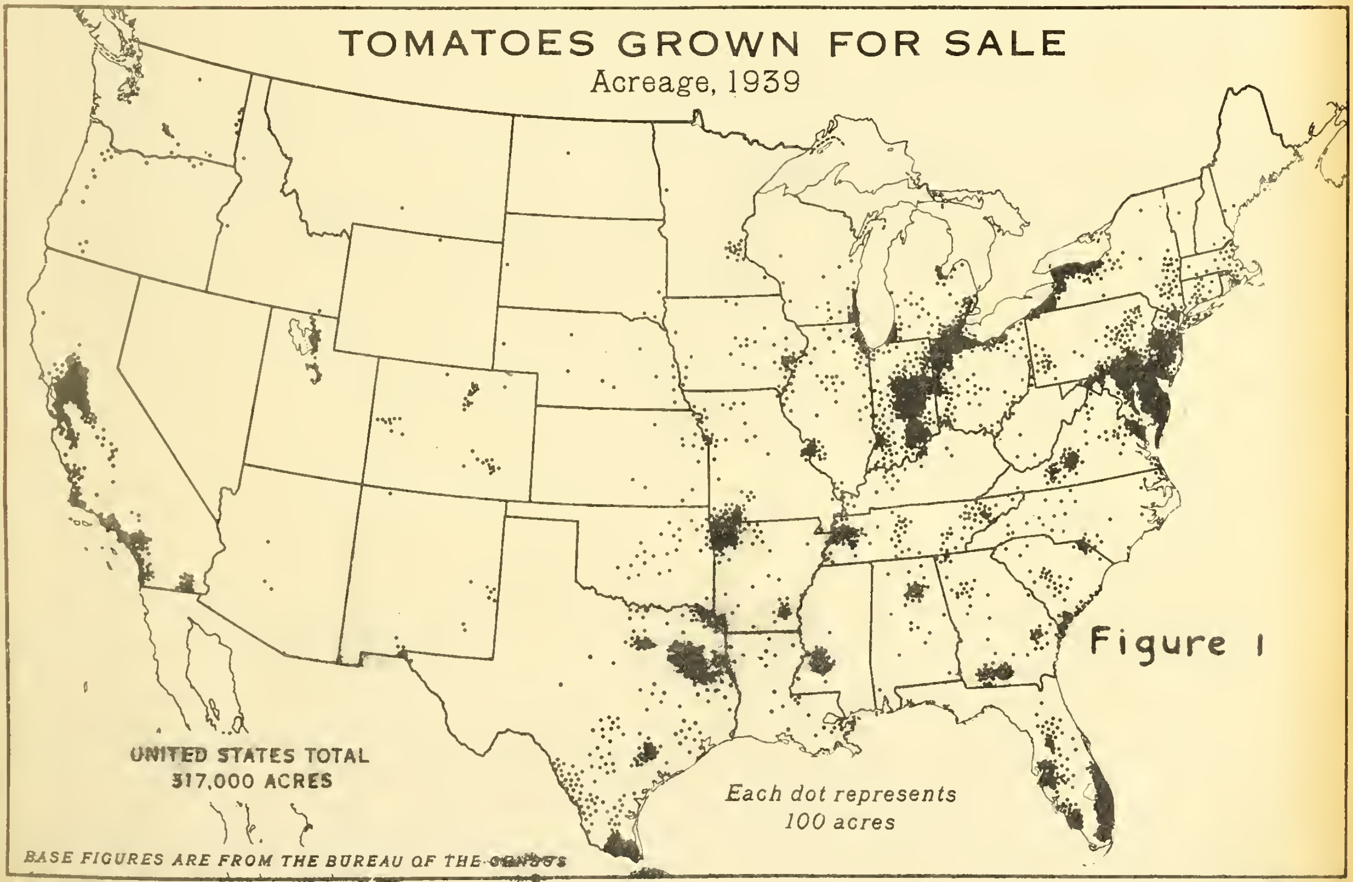


Figure 1

U.S. DEPARTMENT OF AGRICULTURE NEG. 42048 BUREAU OF AGRICULTURAL ECONOMICS

Distribution and Importance of Tomato Late Blight in the Warning Service Area in 1947

Distribution of late blight in 1947 as reported on tomato and potato in the area included in the warning service in this country and in Canada is shown in Figures 2 and 3, respectively. Figure 4 indicates the extent of the loss to the tomato crop as estimated this year, with more specific information as to importance and areas affected in the different States compiled in Table 1. For comparison, the losses due to last year's extraordinary outbreak are shown in Figure 5. Figure 1, which shows the commercial tomato acreage in the United States, is included as a standard by which the reader may judge the effects of varying incidence in different parts of the country in the two years.

The reports and estimates of loss show that tomato late blight was much less widespread in 1947 and caused less loss than in 1946 (Figures 4, 5). In most of the southern and western parts of the area hot dry weather was said to be responsible for the absence or negligible amount of late blight. In the part of the Central Atlantic section where the attack of the disease was general and severe control applications kept loss down (Table 2). In some States where weather was not conducive to serious general occurrence, fungicidal treatment was believed to have been an important factor in preventing severe local outbreaks. Notably this was so in Delaware, New Jersey, and Maryland (see Table 2).

A third factor reported as influencing the amount of tomato late blight was the presence or absence of the tomato strain of *Phytophthora infestans*, which was of particular interest this year since southern-grown transplants were not infected and could not have been responsible for direct introduction into northern fields. Extensive carry-over in Pennsylvania is reported by W. D. Mills, who stated (PDR 31: 230, June 15, 1947) that 13 out of 25 isolates of *P. infestans* from potato tubers grown in 9 Pennsylvania counties were of the tomato strain. Lincoln and Samson (PDR 31: 145-146. Apr. 15, 1947) reported that the tomato strain was isolated by them from potatoes grown in Northern Indiana and, surprisingly, in Idaho. On the other hand, behavior of late blight on tomatoes in Rhode Island, Massachusetts, and Southwestern Virginia indicated that this strain was either not present or else did not appear until late in the season. Remarks comparing occurrence on potato and tomato in other States suggest that strains may be involved or that the two hosts furnish different micro-environments.

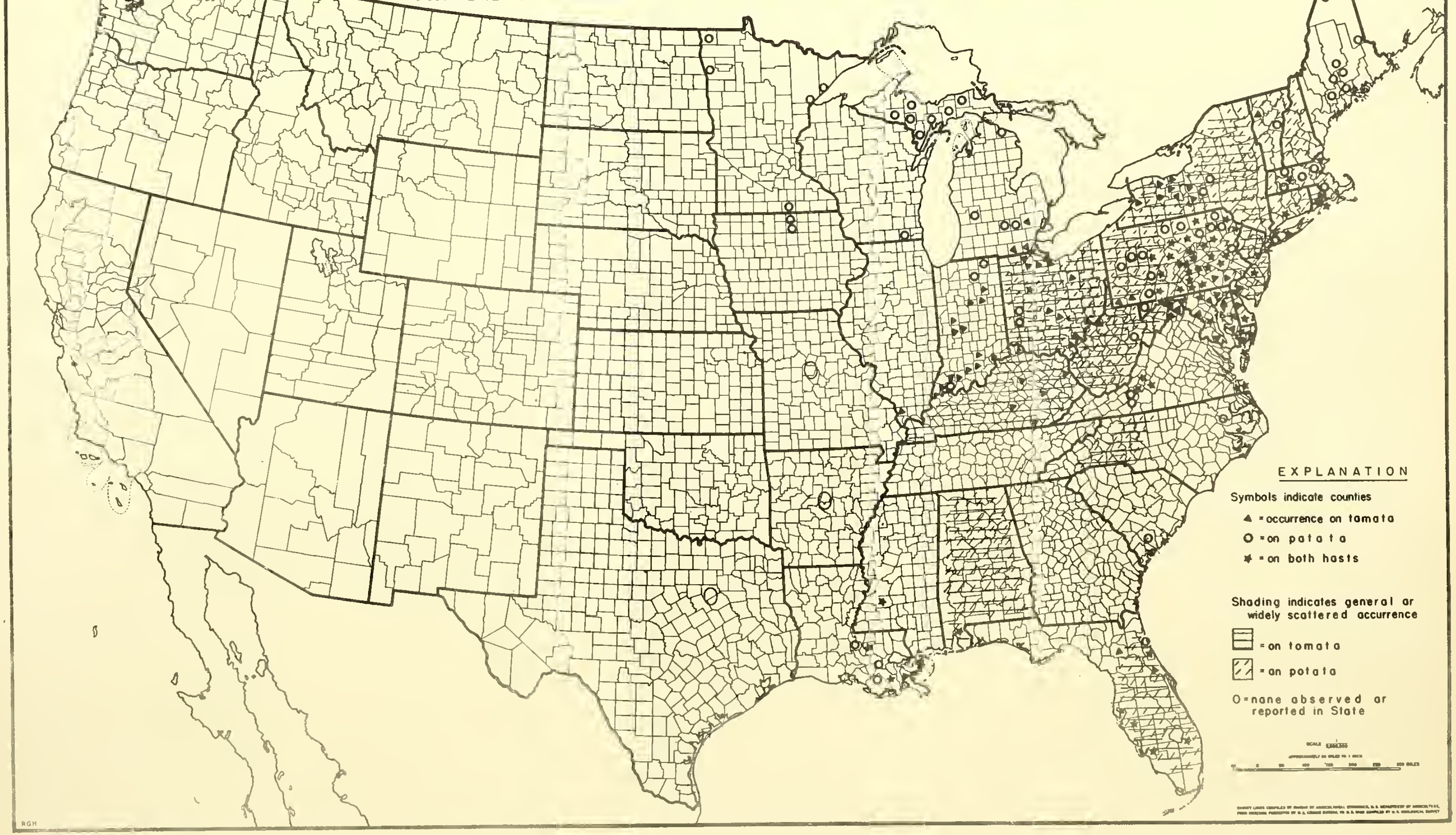
The late blight season began unusually early. The disease was already established in the southern East Coast region of Florida early in November, on potatoes and tomatoes. In the Everglades section very heavy rains interfered with the control program and the fall potato crop suffered heavy loss. Even under these conditions, however, good equipment, proper timing, and frequent applications of Dithane controlled the disease. Early in December blight appeared on potatoes and

Table 1. Losses reported from tomato late blight in 1947.

State	Loss reported
Florida	Widespread, but loss not estimated. Control used generally.
Louisiana	Slight; some loss in Plaquemines Parish.
Mississippi	25-30% in one field; light infection in another; these only fields in which disease was observed.
Alabama	Not serious; scattered infection throughout State.
Georgia	None observed during tomato season.
South Carolina	Negligible; very local occurrence.
North Carolina	None in eastern part; present but loss not estimated in mountain area.
Kentucky	No estimate made; general and destructive in home gardens on early tomatoes.
West Virginia	25-30%; mostly from central mountain area eastward
Virginia	15-20% in Southwestern Virginia, with up to 75-100% in some cases. In Eastern Virginia 3%, confined to one small area on Eastern Shore.
Maryland	20% Western Maryland; 1-5% North-centtral; 2% Southern; 1% northern Eastern Shore; none in central Eastern Shore; 30% in Worcester, none in other counties of southern Eastern Shore.
Delaware	1%
Pennsylvania	20%; if not controlled would have been double. Worst in Central and Northern where 50-90% of untreated fields had blight. In the vici- of Philadelphia T-10% loss. Western Pennsylvania about as bad as 1946 (15-50%).

FIGURE 2 POTATO AND TOMATO LATE BLIGHT (*Phytophthora infestans*) DISTRIBUTION IN 1947

Occurrence as Reported in the Area Included in the Late Blight Warning Service


EXPLANATION
Symbols indicate counties
▲ = occurrence on tomato
○ = on potato
★ = on both hosts
Shading indicates general or widely scattered occurrence
▤ = on tomato
▨ = on potato
O = none observed or reported in State
RGH

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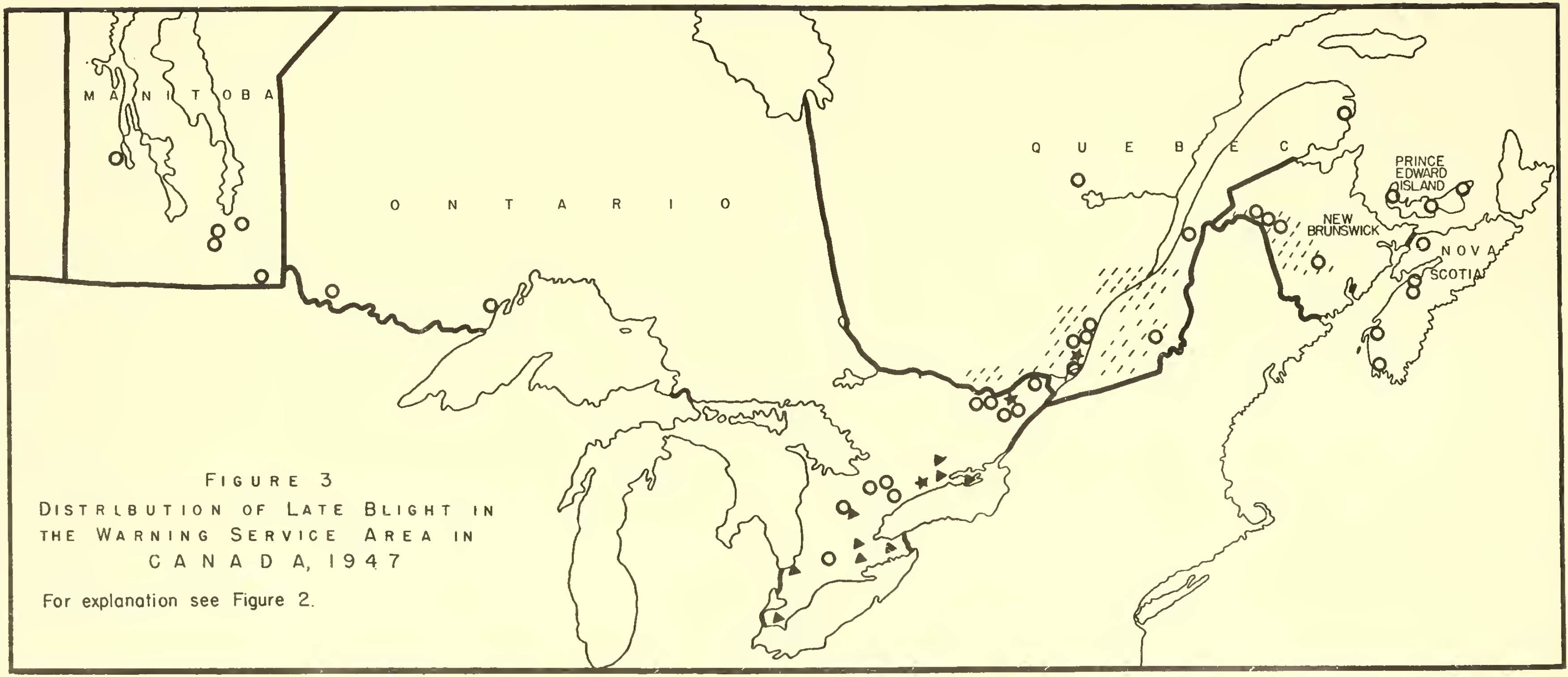

Figure 3

Distribution of Late Blight in the Warning Service Area in CANADA, 1947

For explanation see Figure 2.

Table 1 conc.

State	Loss reported
New Jersey	Much less important than in 1946.
New York	7-10%; worse year for blight than 1946 but control kept loss lower.
Connecticut	No consequence.
Rhode Island	Traces, loss negligible.
Massachusetts	Trace
Vermont	No estimate; less than last year.
New Hampshire	Less than many years.
Maine	Traces.
Ohio	No estimate; small loss in staked tomato area of Southeastern Ohio; commercial canning crop in Northwestern part late and early frosts killed it before late blight damage,
Indiana	Severe in restricted areas, elsewhere traces. No estimate.
Illinois	Only one field noted; disease disappeared in it later.
Michigan	Less than 1%. Only noted in 3 counties in Southeastern Michigan.
Wisconsin	None observed on tomato.
Minnesota	None on tomato.
Iowa	None on tomato.
Missouri	No late blight observed on either host.
Arkansas	No late blight observed.
Texas	No late blight observed.

Table 2. Effectiveness of control against tomato late blight in 1947.

State	Control Materials, effectiveness, extent of use
Florida	Dithane-zinc-lime, Copper A, others not specified. Use very general; results good where applications thorough and according to schedule.
South Carolina	Mostly 6% fixed copper dust; few growers used Dithane Z-78 dust. Better dust program in Charleston and Beaufort areas than in 1946. Little damage even to untreated fields.
North Carolina	In mountain area some dusting in small plantings reduced losses, especially to fruits.
Kentucky	Copper A spray, or C.C.C.S. dust saved commercial plantings of early crop when used. Cuprocide dust not effective. Disease destructive in untreated home gardens on early tomatoes.
West Virginia	Copper in Bordeaux or fixed form mostly used. Many growers have not realized importance of fungicides.
Southwestern Virginia	Spraying and dusting considerably increased from last year; however disease was less severe even where no control measures were used.
Eastern Virginia	Some spraying, 2 to 5 applications, did not affect outbreak in Eastern Shore area because stopped too soon, before blight developed.
Maryland	Fixed copper compounds most widely used; some Dithane and some Zerlate; dusts more than sprays. Regular treatment program seemed better than occasional applications timed on basis of weather. Control good. More treatment than last year, about half on average of acreage received regular program, even more treated at least once. Some use of air dusting, in 2 northern Eastern Shore counties this method used more than ground dusting.
Delaware	About 75% of acreage treated, all of loss from late blight in untreated fields. Fruit infection in untreated fields increased in spite of unfavorable August weather.

Table 2 conc.

State	Control Materials, effectiveness, extent of use
Pennsylvania	Copper fungicides recommended; dusting less effective than spraying. At least 25 tomato spray rings operated. Loss would have been double without control.
New Jersey	Much more copper and other fungicides used than last year. Weather greatest factor in small loss but general use of treatment probably prevented serious local attacks.
New York	Copper sprays or dusts used; hardly a gardener who did not make some applications. Even one did some good; with 5 or 6 applications crop almost free of rot. Spray rings organized; airplanes used in a few instances. Season was more favorable even than last year when loss was 50% or more, but control reduced loss this year to average of 7-10%.
Vermont	Easily controlled in fields sprayed or dusted before July 23; heavy loss in unsprayed.
Ohio	Crop so late that fungicides were not used in many fields, but about 10% of commercial growers used spraying, ground dusting, or airplane dusting. In experimental plots recommended schedules gave good control, while 75% of the plants were killed in untreated checks.
Michigan	About 700 acres dusted twice from air with Dithane; no late blight in these fields although some in area.

tomatoes on the West Coast, and by February it was reported in the Hastings potato-growing region of the upper East Coast. The general use of fungicides such as Dithane-zinc-lime and Copper A kept spread slow in infected fields, although severe loss occurred in some untreated fields and plant beds.

During the second week in February severe freezes killed practically all potato and tomato plants throughout Florida except in some West Coast areas, as well as in other Southern States. This event must surely have been a factor in subsequent late blight development, not only in Florida but in other sections as well. It put back the progress of the disease at least a month, since infection did not reappear in replanted fields and plant beds in the northern East Coast region until the middle of March. It is easy to speculate on the relation of this setback to the absence of infection in Georgia tomato plant beds and the consequent lack of transmission to northern areas with these southern-grown plants.

Aside from Florida, the area in which tomato late blight became most generally prevalent and important in 1947 was in part of the Central Atlantic region, from New York to Delaware on the east and New York to West Virginia and Southwestern Virginia on the west. The area is described in this manner because occurrence in Maryland and Virginia was scattered or local. Late blight was reported in most of this region a month or so later than last year. Subsequent development varied in details in different parts of the area but in general hot dry weather during August checked the disease from Southeastern Pennsylvania southward, while northward and westward August weather was more favorable and spread continued.

1947 was said to be potentially a worse year for tomato blight than 1946 in New York, but because of the practically universal application of sprays or dusts, even in home gardens, the resulting loss averaged 7 to 10 percent as compared with 50 to 70 percent in 1946. In Pennsylvania also losses would have been twice as much as the 20 percent estimated if it were not for the efforts made to keep the disease under control. In the central and northern parts of the State losses in untreated fields ranged from 50 to 90 percent. In both these States control obviously gained a real triumph over the disease.

In Delaware and New Jersey tomato late blight became widespread but was much less severe, mostly because of generally unfavorable weather after the initial spread took place. Nevertheless, fungicidal treatments in these States also were believed to be an important factor in the small loss. In Delaware 75 percent of the acreage was treated and all of the slight damage that occurred was suffered by untreated fields. In New Jersey general use of fungicides probably prevented serious outbreaks in many fields where local conditions were favorable to the disease.

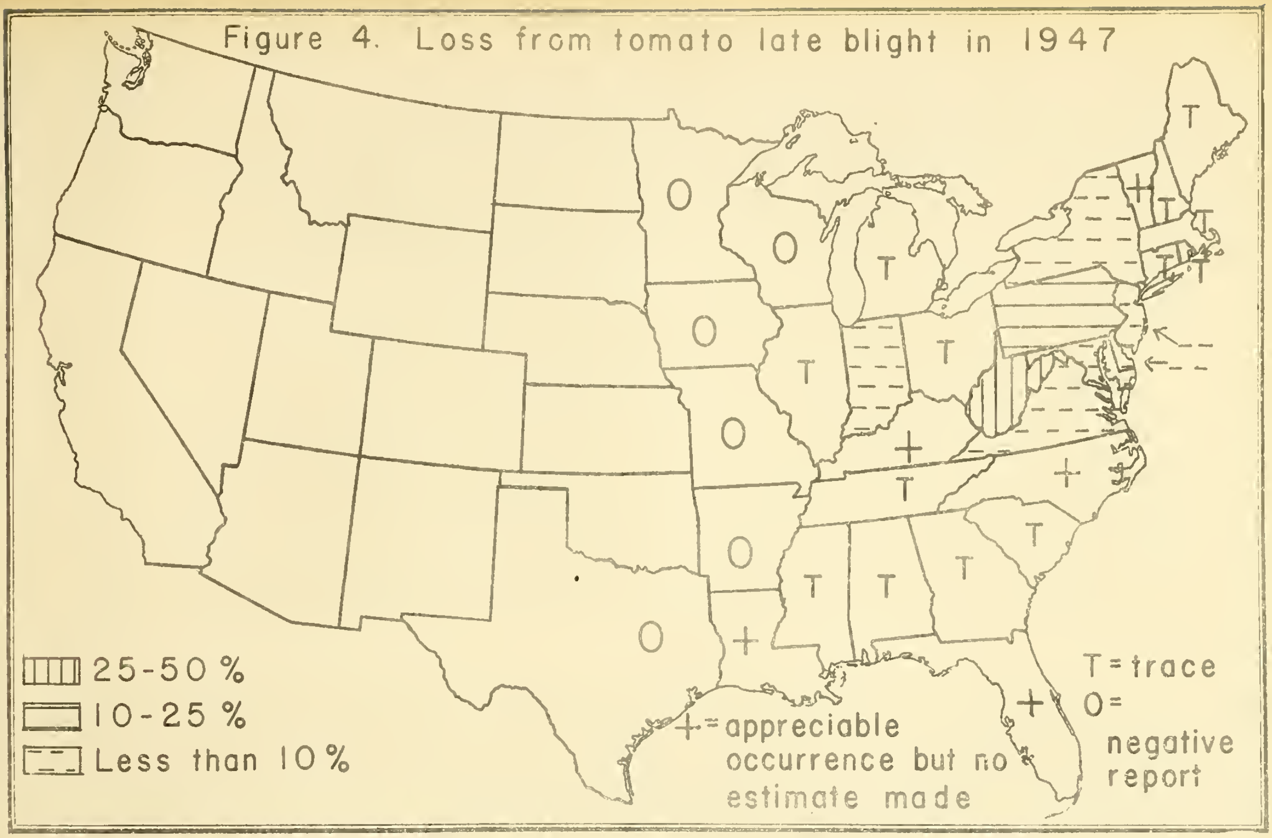

Figure 4. Loss from tomato late blight in 1947

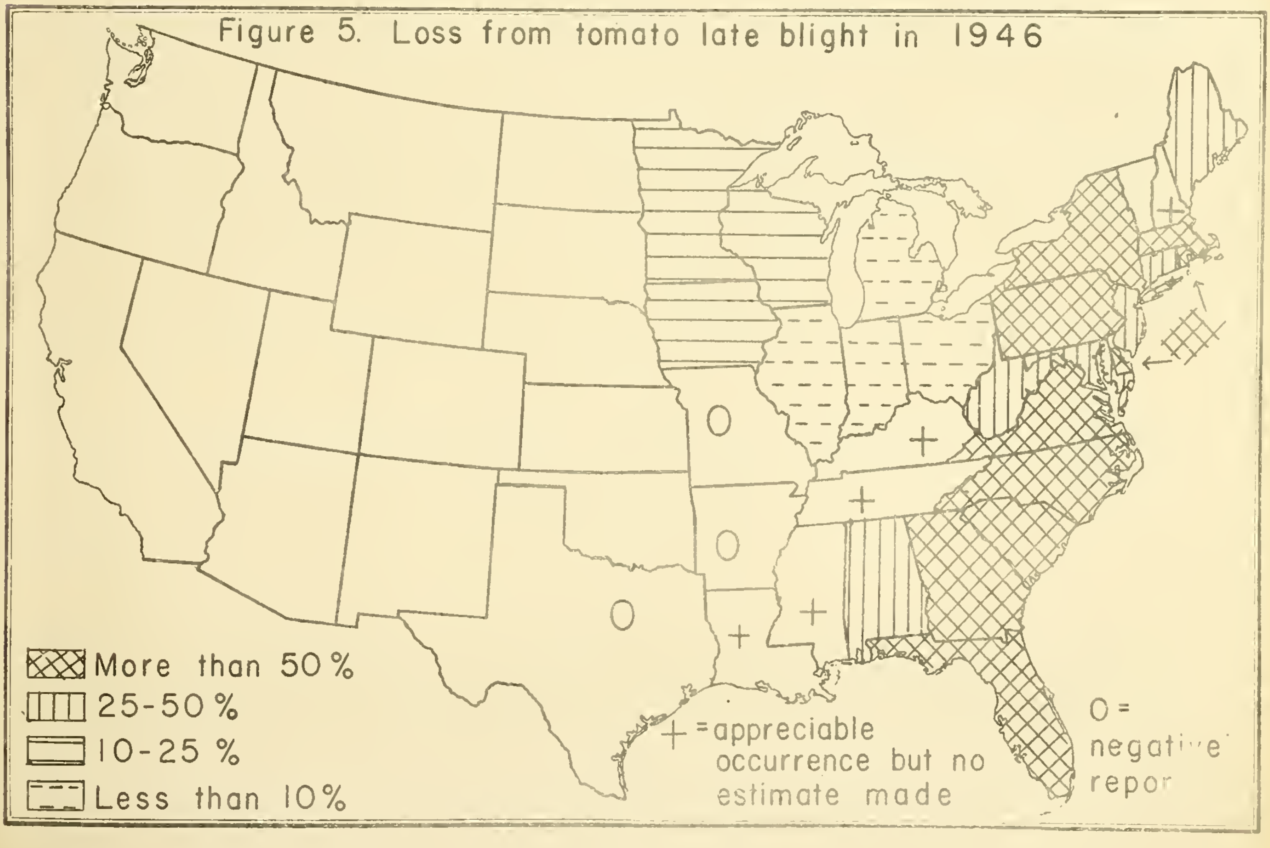

Figure 5. Loss from tomato late blight in 1946

Developments on the Delmarva peninsula were particularly interesting. The disease appeared in Worcester County on the southern Eastern Shore of Maryland in the middle of July after a short period of favorable weather. By the middle of August it was general in Worcester County. Half of the acreage was affected and 30 percent loss resulted, in spite of the fact that 70 percent of the acreage received at least one treatment and half of it was given a regular fungicidal schedule. In the upper part of the Virginia Eastern Shore in northern Accomac County a brief but severe outbreak occurred during a favorable period for two weeks at the end of July and the beginning of August; by August 9 weather had again checked the disease and by the middle of the month it had disappeared. In Delaware spread of blight started July 22 and by the 31st the disease was general throughout the State in untreated fields, but absent or scarce in treated plantings. Late blight did not appear in the southern part of the Virginia Eastern Shore, and did not become established in the central counties of the Maryland Eastern Shore.

Some significant local observations may be mentioned briefly. In New York tomato varieties that did not develop infection until late in the season last year were infected as early and as severely as other varieties this year. In Maryland the disease was found on a new host, Solanum dulcamara. In Delaware it was observed that fruit infection increased in untreated fields during the first half of August in spite of unfavorable weather, suggesting the existence of favorable temperature and moisture conditions within the confines of the plant. In Maine the fungus was found sporulating in a potato field when the temperature was 88° F, with 99 percent humidity (PDR 31: 370. Oct. 15, 1947). Similar observations of activity on potato and tomato under conditions not generally considered favorable were reported from Florida (PDR 31: 309-310. Aug. 15), and occurrence in a potato field in Louisiana in December 1946 is believed to indicate that the organism must be able to carry through the summer weather in that State (PDR 31: 6-7. Jan. 15)

Statements of the Key Pathologists regarding the effectiveness of control measures and the extent to which they were used have been compiled in Table 2.

State summaries contributed by the Key Pathologists are given below. During the season their current reports were published in the Reporter.

Summary

Outstanding features of the occurrence of late blight on tomatoes in the warning service area in 1947 are the early appearance and general establishment of the disease in Florida, the February freeze that killed most of the potato and tomato plants in much of Florida as well as in other Southern States, the absence of infection of southern-grown plants in contrast to the prominent role of this source of inoculum in 1946, the limited area of real damage as compared with the destructive sweep of the disease throughout the eastern part of the country last year, and the demonstrated effectiveness and importance of spraying or dusting for late blight control.

DIVISION OF MYCOLOGY AND DISEASE SURVEY

STATE REPORTS

LATE BLIGHT IN FLORIDA IN 1947

W. B. Tisdale

Late blight appeared in the southern part of the State in the vicinities of Homestead and Belle Glade in plant beds and fields early in November, 1946. From that date until February 1, rains were frequent and in the Everglades some were heavy. This made conditions unfavorable for spraying or dusting, and favorable for development of late blight. As a result, spraying or dusting could not be done at the proper time and many plant beds and fields were abandoned. Some growers who had good equipment and sprayed at the right time controlled the disease with Dithane when it was applied every 3 to 5 days. In fields that were too wet to follow a regular spray program or where no fungicide was used potato vines were dead by November 25.

Townsend estimated that the fall potato crop in the Belle Glade area was reduced by about 75 percent. No estimate of loss due to blight alone was made for the Homestead area.

Late blight was reported on potatoes on the West Coast in the vicinity of Ft. Myers about December 1, 1946 and a few days later slight infection was found on tomatoes in that area, and near Punta Gorda. Early in January, 1947, late blight was found on tomatoes at Bradenton, Sanford, and about two weeks later at Leesburg. It was reported in the Hastings area on February 4. The disease spread slowly in these areas during January, except in certain fields where severe loss was experienced in fields and plant beds where no fungicides were used. Spraying with Dithane-zinc-lime, Copper A, and others held the disease in check where applied thoroughly according to schedule.

During the period February 8 to 15 practically all potato and tomato plants in all areas except Bradenton and Ft. Myers were killed by cold weather. In the latter areas the disease had been generally controlled by spraying or dusting.

Tomato plants started after the freeze and potato plants which came back in the Homestead and Hastings areas showed no signs of late blight until about the middle of March. It was generally distributed in the West Coast areas where the plants were not so badly damaged by the cold, but it was not severe. Most growers continued to spray, mostly with Dithane and Copper A. The general consensus was that lack of favorable conditions helped to hold it in check, as with return of more favorable conditions during the middle of March the disease grew more serious and widespread. About this date it appeared on potatoes in the Hastings area and on tomatoes in the Sanford area. During April it became prevalent in all of these areas, but not serious. Prevailing warm, dry weather seemed largely responsible for preventing serious development. In most other parts of the State late blight never appeared as it did in 1946. No signs of the disease were observed in the vicinity of Gainesville until about the last of May. This general, but light infection developed during and following a week of daily rains and relatively high temperatures.

Under the prevailing conditions it seemed impossible to estimate the loss due to late blight, and so far as I know no one in the State except Townsend made an estimate.

FLORIDA AGRICULTURAL EXPERIMENT STATION, GAINESVILLE

LATE BLIGHT IN LOUISIANA IN 1947

C. W. Edgerton

Late blight made its appearance early. The fall of 1946 was comparatively warm and no killing frost occurred until late in December. Differing from what had been observed in previous years, late blight was found on the fall crop of potatoes in the middle of December. How the disease lived over the previous summer has not been explained. During the winter of 1946-47 the late blight was observed on tomatoes in the greenhouse from time to time. Late blight was first observed in the spring on potatoes in Terrebone Parish in the southern part of the State on April 7. In the following week the disease was found in a number of localities, though the infection was still light. During the next three weeks a general infection developed. During the early part of May the blight was checked by warm dry weather. Another short period of spread occurred during the latter part of May. Losses were rather heavy in the southern part of the State, possibly as high as 25 percent. Some fields were a total loss. Further north in Pointe Coupee Parish the losses were less. Some spraying and dusting was carried on in the southern part of the State and considerable in Pointe Coupee Parish. The spraying and dusting in general gave satisfactory results.

Losses on tomatoes were slight. There were some losses in Plaquemines Parish south of New Orleans. In other parts of the State, the disease was checked by the warm dry weather.

No blight has as yet (November) been observed on fall tomatoes or potatoes in the fall of 1947.

LOUISIANA STATE UNIVERSITY, BATON ROUGE

SUMMARY REPORT OF LATE BLIGHT IN MISSISSIPPI

Douglas C. Bain

The writer was unable to make periodic surveys over the State and therefore had to depend on the cooperation of Plant Board Inspectors and County Agents to obtain information outside of Copiah County. No reports were received, hence, it is assumed that either there was no late blight on tomatoes or potatoes or if there was it did not amount to much.

Late blight was first observed in Copiah County in two garden patches of potato on May 16. Most of the tops were eventually killed but the crop was made. The fungus did not spread to tomatoes in several large fields within a half-mile radius.

The disease was next found on June 4, in a two-acre field of tomatoes at least six miles away from the infected potato patches. The disease was uniformly spread over the entire field. Judging from the general distribution of the disease and the fact that the plants were brought in from out-of-State, it was assumed the fungus came in on the plants. It was roughly estimated that the yield was reduced 25 to 30 percent.

On June 12, a light infection was found in another field (three to four acres) about three miles from the field reported above. The plants were home grown, and were nowhere near diseased potatoes. Tomatoes were not grown in this field last year but were grown just across the road. The source of infection can not be explained except possibly the grower accidentally brought the fungus in from the heavily diseased field. The grower owned both fields.

Late blight in Mississippi this year was not widespread and caused no damage to tomatoes (except in one small field) or potatoes. There was no comparison at all to the years 1944-45 with respect to damage. No comparison can be made to 1946 because the writer did not see the situation that year; however, reports indicated considerable losses in tomatoes last year.

MISSISSIPPI TRUCK CROPS EXPERIMENT STATION, CRYSTAL SPRINGS

LATE BLIGHT IN ALABAMA IN 1947

Coyt Wilson

Late blight was not a serious problem in Alabama during 1947. In January Mr. Frank Garrett at the Gulf Coast Substation, Fairhope, Alabama, reported the finding of a tomato plant infected with Phytophthora infestans. It is assumed that the fungus had survived the fall and winter on living hosts in that vicinity. However, all tomato and potato plants in southern Alabama were killed by a rather severe freeze that occurred in February.

Late blight was not found again until about the middle of April when it appeared in a field of Sebago potatoes near Bon Secour. Soon afterwards the disease was found in several different fields scattered throughout the southern part of Baldwin County. Apparently each of these infection centers had developed from diseased seed potatoes. The disease spread slowly from these centers and, except for those fields that were damaged by hail in late April, there was very little damage.

The total damage from late blight in Baldwin County was about 5 percent. Scattered infections of late blight occurred throughout Alabama on both potato and tomato but the disease never became serious. After May 1 the weather was mostly unfavorable for late blight development.

Copper dusts, applied with tractor dusters, proved to be reasonably satisfactory. The effectiveness of airplane dusting varied. Some growers were well pleased; others, with small fields surrounded by trees or other obstructions, found that better coverage could be obtained with ground equipment.

Dithane spray appeared to be very effective when applied with proper equipment. Some zinc ethylene bisdithiocarbamate dust was used, but there was no opportunity to compare its efficiency with the copper dust.

ALABAMA AGRICULTURAL EXPERIMENT STATION, AUBURN

NO LATE BLIGHT IN SOUTH GEORGIA

Edward K. Vaughan

I did not see any late blight infections at all during the 1947 season on either the tomato seedlings grown for shipment to the North, or tomatoes grown for shipment of "green wrap" fruit to northern markets, nor did anyone report the presence of this disease to me during the entire season. Frequent observations were made in many fields and if the disease had been present I am sure it would have been found.

A number of potato fields were also kept under observation. No late blight infections were seen and none were reported to me.

For the season of 1947, no losses due to late blight (Phytophthora infestans) were sustained by either tomatoes or potatoes in South Georgia.

Formerly with UNITED STATES BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, DIVISION OF FRUIT AND VEGETABLE CROPS AND DISEASES, TIFTON, GEORGIA

LATE BLIGHT IN NORTH GEORGIA

Julian H. Miller

The county agents in the southeastern counties found no blight as Dr. Vaughan reported. One of the state inspectors did discover some leaf infections on seedling tomato plants in a field of remnants after the plant shipping season was over.

In north Georgia I found some heavily blighted potato fields in Rabun County in July. This is one of the mountain counties where one can find Phytophthora every year on potatoes, but I did not see any on tomatoes in nearby patches. Recently, during the first week in November, I have collected it on tomatoes on the Horticultural Farm at Athens. There was none on the summer crop and it is unusual for it to appear now. This must be a holdover from last year of the same strain. Last year was the first time I had seen it in this region.

UNIVERSITY OF GEORGIA, ATHENS

LATE BLIGHT IN SOUTH CAROLINA - 1947

William M. Epps

Late blight on tomatoes and potatoes was only of very minor significance in South Carolina in 1947. It appeared early in May on potatoes and early in June on tomatoes, but because of hot dry weather following the initial appearance, no significant loss resulted to either crop.

Blight was first found on potatoes in the Edisto Island section of Charleston County on May 8, 1947. The farm on which it first appeared was in the same community as that farm where blight was first found in 1946. It was obvious from the extent of spread of the disease that at least one and possibly two secondary infection cycles had occurred prior to May 8. A rapid search of the same field on April 29 failed to reveal any blighted leaves. The disease spread slowly into the adjoining counties of Beaufort and Colleton and across from Edisto Island to the mainland and to adjacent islands in Charleston County. The hot dry weather retarded its spread and restricted the damage to the potato crop to less than 1 percent for the area as a whole. Only on a few farms was there a measurable loss and even there it was not severe.

Late blight did not appear on tomatoes until early in June. Tomatoes are not grown commercially in the vicinity of Edisto Island, where blight first appeared on potatoes. Blight appeared on tomatoes in the Charleston and Beaufort tomato areas about a month after its original appearance on potatoes on Edisto Island. No appreciable damage was caused because of the hot weather that followed the initial appearance. Some growers attribute control to the use of fungicides, but untreated fields on neighboring farms also suffered no measurable damage. No reports of the occurrence of late blight have been received from the inland counties of Orangeburg and Dillon that suffered so heavily in 1946. The Piedmont section of the State experienced a very dry season and no late blight developed.

In general a better dust program was followed in Charleston and Beaufort Counties than was followed in 1946. Most of the inland tomato farmers, however, were not equipped to apply fungicides and many of them either reduced their acreage or cut out tomatoes altogether rather than purchase the equipment necessary to dust the crop. A 6 percent fixed copper dust was used most extensively for blight control both on tomatoes and potatoes. A few growers used a Dithane Z-78 dust on all or part of their acreage. There was no opportunity to compare the two materials.

Late blight reappeared at Charleston late in July on some summer tomatoes in the breeding plots at the experiment station. It spread throughout the plot area in spite of the warm weather and caused considerable defoliation. No commercial tomatoes are grown in coastal South Carolina during July and no report of blight in home gardens was received.

SOUTH CAROLINA TRUCK EXPERIMENT STATION, CHARLESTON

LATE BLIGHT SUMMARY FOR NORTH CAROLINA, 1947

J. H. Jensen

The first report of late blight on potatoes was on the Coastal Plains on June 6 when scattered amounts occurred as digging operations began. With the exception of one or two irrigated fields where complete defoliation and some tuber rotting appeared no appreciable damage occurred. The advent of warm weather and the maturity of the vines held up progress of the disease.

In the mountain area late blight occurred as usual. Dry weather served to reduce the extent of infection on both tomatoes and potatoes in the early portion of the season. Some dusting of small tomato plantings was effective in reducing losses, especially to fruits, but there were heavy losses on tomatoes in home gardens. It was not possible to estimate total losses in the mountain area on either tomatoes or potatoes.

UNIVERSITY OF NORTH CAROLINA, RALEIGH

LATE BLIGHT SEVERE ON EARLY TOMATOES IN KENTUCKY

W. D. Valleau

Following the first outbreak of late blight on tomatoes late blight became general over the State and destroyed a large part of the early tomatoes in home gardens. Very few plantings escaped.

According to J. S. Gardner, commercial plantings of early tomatoes were saved when sprayed with Copper A, or dusted with C.O.C.S. dust. Cuprocide dust, he reports, was not effective. Late tomatoes and second crop potatoes got by whether sprayed or dusted or not.

UNIVERSITY OF KENTUCKY, LEXINGTON

LATE BLIGHT SUMMARY FOR WEST VIRGINIA--1947

H. L. Barnett

As was the case in most States, late blight of both potatoes and tomatoes did not cause the widespread destruction that was experienced in 1946. The disease appeared rather early (June 10) and had the appearance of duplicating the course that it took in 1946, but the spread did not materialize. Late blight was first found occurring on potatoes in Randolph County, and then was reported in rather rapid succession from a number of other counties in the State. However, the intensely hot and dry period that developed shortly after June 20 and continued on until about July 8 is believed to have been the greatest single factor in the limitation of late blight this year. Soon after July 4, reports of the occurrence of late blight ceased to come in and the Extension Pathologist had difficulty in finding an active case of late blight in the State.

Late blight of both tomatoes and potatoes did not reappear in any appreciable amount until around the 1st of August. At that time, it was found causing considerable loss in a commercial tomato field in Morgan County. Incidentally, the tomato plants in this planting were southern-grown plants, but other factors present could well have been responsible for the severity of the disease. The soil was exceptionally rich in organic matter and additional applications of nitrogen had been made. The plants were rank and growing vigorously but were planted at distances of 3 x 3 feet which, coupled with the growth of the plants, made for an almost solid mat of foliage. When this field was first examined, it looked perfect, but on going into the field and turning over some of the foliage, most of the under leaves were already diseased. Within ten days the field was practically a total loss. This instance was not duplicated in any of the other fields seen, even where southern plants were used. It is believed that the chief reason why other growers escaped such loss was due largely to the fact that the general planting distances this year were either 3 1/2 x 5 1/2 or 3 x 6 feet.

Generally speaking, the disease was not so destructive as it was in 1946, but it did cause considerable damage, especially in home gardens where an adequate spray or dust program was omitted. The area of the State most severely attacked this year was that of the central mountainous region and from thence eastward to the eastern limits of the State of West Virginia. The disease was found in scattered areas in other parts of the State but not in any great amount. The percentage loss of tomatoes for the whole State due to late blight was around 25 to 30 percent and for potatoes about 15 to 20 percent. The losses in potatoes were less, chiefly because a better disease control program is practiced on that crop. Late blight of tomatoes is so recent that too many of the growers have not yet realized the importance of spraying or dusting.

Some cultural practices were suggested for the control of late blight; and copper, in bordeaux or fixed form, was the chief fungicide in use.

No information regarding the presence of strains of the fungus is available.

The above information has been summarized by Mr. C. F. Bishop, Extension Pathologist.

WEST VIRGINIA UNIVERSITY, MORGANTOWN

LATE BLIGHT OF TOMATOES IN WESTERN VIRGINIA

S. B. Fenne and S. A. Wingard

In the western part of Virginia, late blight in 1947 was first reported from Bedford County on July 10. On July 22, it was found on tomatoes and potatoes in Roanoke and Botetourt Counties. Numerous tomato fruits had been destroyed. In all cases where late blight was found on tomatoes, the crop was being grown adjacent to potatoes. On July 23, late blight was observed on tomato fruits in Bedford County. In one garden, about 50 percent of the fruits were infected. Weather conditions during July appeared to be ideal for the development of late blight: cool nights and warm days with frequent showers and high humidity.

During the period from July 22 to August 12, late blight apparently became fairly general over the State. Yet, because of the unusual weather conditions, wet and cool in some areas and exceedingly dry in others, late blight did not reach epiphytotic proportions except in a limited section of the Virginia Eastern Shore (reported by Dr. H. L. Cook, PDR August 1). Many reports concerning late blight were received from growers during this period, but upon checking these reports it was usually found that the trouble was due to blossom-end rot or some disease other than late blight.

On August 20, late blight could be found in practically every tomato and potato field visited in the mountain area of Southwest Virginia, but in most cases it appeared too late in the season to cause very serious losses. However, in individual cases, 75 percent to 100 percent losses occurred.

On the whole, tomato late blight was much less injurious this year than in 1946, with a probable reduction in yield in Western Virginia of from 15 to 20 percent. We are at a loss to account for this great difference in the amount of late blight this year as compared to last on the basis of prevailing weather conditions and control measures employed.

This is especially true in the vicinity of Blacksburg, where the weather conditions appeared to be ideal for the development of the disease several weeks before it was first observed and continued so for several weeks thereafter. In spite of this, late blight did not reach epiphytotic proportions until very late in the season, actually just before a killing frost occurred in late September. There seemed to be some factor other than temperature and humidity responsible for the small losses sustained by tomato growers. While it is true that spraying and dusting was considerably increased over the past year, this cannot be given credit for the comparatively small losses sustained, because the disease failed to develop in such major proportions as last season even where no control measures were employed. Perhaps we did not have the tomato strain of the late blight fungus present in Virginia this season.

VIRGINIA POLYTECHNIC INSTITUTE, BLACKSBURG

SUMMARY OF LATE BLIGHT IN EASTERN VIRGINIA IN 1947

Harold T. Cook

Late blight was not important in Eastern Virginia in 1947. A trace occurred on the early crop of potatoes late in the season but caused no damage. Damage to tomatoes was confined to a small area at the northern end of the Eastern Shore. It is doubtful if blight would have received much notice this year if people had not been looking for it because of the epiphytotic in 1946.

The weather during the early part of the season was very unfavorable for late blight. Precipitation in May was 1.95 inches below normal and 4.64 inches less than in 1946. In June, it was 0.33 inches below normal and 0.67 inches less than in 1946.

The weather forecasting charts in May and June indicated that conditions were unfavorable for late blight and forecasts were issued to that effect on May 15, 22, 29, and June 5.

Two potato leaves affected with blight were found in a low sheltered corner of an irrigated experimental field on June 9. Other plants in that protected corner of the field became infected gradually but the spread was very slow and the rest of the field remained entirely free from the disease.

Fairly general foliage infection occurred in a few potato fields in Princess Anne County on June 24. These fields were located on lowlands and were surrounded by pine forests. This outbreak was associated with an average mean temperature of 71° F. and a 1.2-inch rain during the period of June 15 to 27. The potatoes were being dug at that time and there was neither reduction in yield nor tuber rot.

Light foliage infection was general on the potato crop in the northern end of the Eastern Shore during the latter part of July, but was not severe enough to attract the attention of the growers or to cause any reduction in yield.

A few specimens of tomato fruit affected with late blight were received from Princess Anne County on July 17 and 18. One lot was from a home garden located on low land. The tomatoes were growing alongside a row of blight-infected potatoes. The others were from a quarter-acre commercial planting that was also located on low wet land.

Light foliage infection was found in most tomato fields in Princess Anne County on July 28 and severe foliage and fruit infection was found in one commercial field. High temperatures in August checked this outbreak and even the severely infected field recovered and produced a large number of good quality fruit.

Tomato fruit infection was reported from the vicinity of Temperanceville in the northern end of the Eastern Shore on July 25. A survey on July 29 showed that late blight was epiphytotic in a six-mile wide belt across the Eastern Shore between Temperanceville and Nelsonia. Foliage infection was general from Temperanceville to the Maryland line (six miles), but the disease disappeared rapidly south of Nelsonia. The outbreak was associated with mean temperatures below 75° F. from July 24 to 30 and a very heavy rainfall at the beginning of the period. The Temperanceville-Nelsonia area also had a number of heavy local rains.

A survey on August 9 showed that the disease had been checked by high temperatures and that tomatoes were being picked even in the fields that had been severely infected. Fruit infection apparently had been confined to the Temperanceville-Nelsonia area. Blight had disappeared almost completely by August 18.

No blight was found in the lower three-fourths of the Eastern Shore or in the counties west of Chesapeake Bay.

It is estimated that 90 percent of the Virginia tomato crop was entirely free from blight and that severe damage was confined to less than 7 percent of the crop. Since blight was severe for only a short period, the reduction in yield probably amounted to not more than 3 percent.

There were numerous reports of late blight during the 1947 season, but except for those cited above, they were all erroneous. Blossom-end rot and buckeye rot were frequently mistaken for late blight infection of the fruit. In one case, a severe infestation of red spider was mistaken for late blight. Yellowing of the leaves as the result of the fertilizer leaching out was also mistaken for blight. More recently tuber worm damage to the potato tops has been mistaken for blight.

Tomatoes were remarkably free of fruit damage from anthracnose and bacterial spot. There was some Alternaria and some Septoria foliage infection, but it did not reduce the yields or the quality of the fruit.

The 1947 tomato crop was exceptionally good this year. There were exceptionally high yields and the fruit was remarkably free of defects. Canning factories were having difficulty in handling the crop toward the end of the season.

No spraying or dusting experiments were conducted by this Station. Experiments in previous years have shown that spraying or dusting does not pay in Eastern Virginia in an average year. However, one of the large canning companies persuaded some of the growers to spray or dust. A considerable number of those using fungicides happened to be located in the Temperanceville-Nelsonia area where late blight caused damage. These growers had made from two to five applications. Blight was equally as bad on fields that had been treated as those that had not. The treatments had been made earlier in the season when the weather was unfavorable for blight. No treatments had been made during the two weeks preceding the outbreak because at that time the plants were too large to treat without considerable wheel damage.

Spraying or dusting was recommended by this Station after the outbreak at the end of July. Some growers did dust by plane, but most of them did not treat because of the advanced stage of the crop and a temporary drop in price.

Spraying or dusting for such isolated outbreaks that occur in July and August will not be recommended in the future. A study of the weather records show that favorable weather for the blight does not last more than about seven days at that time of the year and that the disease will be checked by higher temperatures before sprays or dusts can take effect.

VIRGINIA TRUCK EXPERIMENT STATION, NORFOLK

LATE BLIGHT IN MARYLAND IN 1947

Carroll E. Cox

Late blight of tomatoes was first observed in Maryland in 1947 on July 2, at two widely separated points. One was in a home garden near Hagerstown, in the western part of the State, and the other was in a small field near Federalsburg in the central part of the Eastern Shore. In both cases the tomatoes were growing adjacent to potatoes and evidence indicated that the pathogen had overwintered in potato tubers. In the Hagerstown garden both tomatoes and potatoes were affected by late blight in 1946 and volunteer potato plants came up in the garden in 1947 from tubers left in the ground over winter. In addition to tomatoes and potatoes, Solanum dulcamara L., growing as an ornamental in the same garden, showed late blight lesions on July 10. Inoculum from foliage lesions on all three species was capable of causing infection of tomato and S. dulcamara foliage in the laboratory. There may have been some spread of the disease from this initial outbreak, in Hagerstown, into nearby plantings before the disease was brought under control. The Federalsburg outbreak soon disappeared following the application of a fungicide and with the occurrence of warm dry weather there were no further outbreaks in that area during the season.

From July 10 to 15 weather favoring the development and spread of late blight prevailed throughout much of Maryland. Immediately thereafter, late blight appeared on potatoes in Western Maryland and on potatoes and tomatoes in the extreme southern part of the Eastern Shore. It also made its appearance on tomatoes in Carroll, Baltimore, and Harford Counties in the north-central part of the State. These three outbreaks apparently resulted from air-borne inoculum.

During early August, late blight was found at several places in Maryland near Washington, D. C. and in Kent County at the northern end of the Eastern Shore. It continued to spread in western and northern Maryland, especially in Washington and Carroll Counties, and in Worcester County on the lower Eastern Shore. Elsewhere the disease spread very little.

By the middle of August late blight was general in Worcester County and rather widespread in parts of Washington and Carroll Counties. It did not appear in the southern Maryland counties of the western shore until September. Late blight never became established in the central counties of the Eastern Shore where large acreages of tomatoes are grown. In contrast with 1946 there was no time during 1947 when late blight was truly epiphytotic throughout Maryland.

Overall losses from late blight were very light, in spite of severe damage in small areas. Early blight probably caused heavier losses

Table 1. Estimated occurrence and losses from late blight, and use of fungicides in commercial tomato and potato growing areas in Maryland in 1947

Area	Percent of total acreage infected		Loss as percent of total yield		Percent of total acreage treated with fungicide at least once		Percent of total acreage receiving regular spray or dust program	
	Tomato	Potato	Tomato	Potato	Tomato	Potato	Tomato	Potato
WESTERN MARYLAND								
Chiefly Washington County	15	--	20	--	95	--	90	--
Chiefly Garrett County	--	8	--	1	--	90	--	90
NORTH-CENTRAL AREA								
Carroll County	50	--	5	--	75	--	50	--
Other counties	3	--	1	--	90	--	50	--
SOUTHERN MARYLAND (Western Shore)	2	--	2	--	5	--	1	--
NORTHERN EASTERN SHORE	2	--	1	--	20	--	10	--
CENTRAL EASTERN SHORE								
Caroline County	--	--	--	--	60	--	20	--
Other counties	--	--	--	--	1	--	0.5	--
SOUTHERN EASTERN SHORE								
Worcester County	50	10	30	2	70	50	50	--
Other counties	--	--	--	--	35	75	30	70

than late blight this year.

The extent to which fungicides were applied varied greatly in different parts of the State, but a larger percentage of the acreage was sprayed or dusted this year than in 1946 (see table).

The fixed copper compounds were the most widely used fungicides. Some Dithane was applied on the Eastern Shore and some Zerlate, especially in the north central part of the State, before late blight appeared. Growers in areas where late blight occurred seem to be generally agreed that a regular spray or dust program was better than attempting to time occasional applications on the basis of weather conditions. Most of them felt that the fungicides gave good control of late blight but inadequate control of early blight.

Dusters were used more extensively than sprayers, especially on the Eastern Shore. Some acreage was dusted with airplanes and helicopters, but only in the two northern counties of the Eastern Shore did the acreage dusted from the air exceed that treated with ground equipment. In areas where late blight occurred this year it is expected that about the same number of growers will apply fungicides again next year. In the areas where late blight did not appear in 1947 fewer growers apparently are planning to apply fungicides next year.

In about half of the commercial acreage of tomatoes wider spacing of plants was used than in previous years. Present indications are that more growers will use wider spacings next year.

Weather conditions together with the more widespread application of fungicides probably operated to reduce the amount of inoculum, retard establishment of the disease and thus to limit the severity of late blight in 1947 as compared with 1946.

The accompanying table summarizes estimates of the acreage infected and losses from late blight as well as estimates of the acreage protected by fungicides in commercial tomato and potato growing areas in Maryland in 1947.

There was general approval of the operation of the late blight warning service.

UNIVERSITY OF MARYLAND, COLLEGE PARK

LATE BLIGHT OF TOMATOES IN DELAWARE--1947

J. W. Heuberger

Late blight disease caused a negligible loss (1 percent) to the tomato crop in 1947, and the loss that occurred was entirely in untreated fields. The fact that approximately 75 percent of the tomato acreage was treated with a fungicide, coupled with generally unfavorable weather during August and early September for late blight spread and development, served to keep the disease in check.

Late blight was first found on June 26 in one field in Kent County; this remained the only case until July 22. The source of infection is not known. (In 1946, late blight was first found on May 29 in two fields planted with southern-grown plants). No further cases of late blight were found until the period July 22 to 31; on July 31, the disease was widely scattered over the State in untreated fields whereas it was not present, or difficult to find, in treated fields. This period coincided with the report by Dr. H. T. Cook (PDR 31 (9): 335-337) of an epiphytotic in the northern half of Accomac County on the Eastern Shore of Virginia. (In 1946, the first wave of infection occurred the first week of July. This period coincided with a period of heavy foliage and fruit infection on the Eastern Shore of Virginia.)

Very little spread and development of late blight occurred after July 31 as the weather from then on, particularly the first half of August, was generally unfavorable. Of interest, however, was the fact that fruit infection increased in untreated fields during the first half of August in spite of unfavorable temperature and rainfall conditions. This may indicate that the temperature and moisture conditions within the confines of the plant were favorable even though the external conditions were not.

The late blight disease was not a problem on late potatoes. It was found in the southeastern corner of the State in late August in fields on low land. It made little progress for the remainder of the season. (In 1946, the disease was epiphytotic on late potatoes). In view of the heavy tuber infection in 1946, it was anticipated that the fungus would carry over-winter in infected tubers in fields that were not harvested. However, examination of volunteer potato plants in these fields in the spring of 1946 revealed that none showed late blight and that all the plants came from healthy tubers. Thus, the infected tubers must have rotted during the winter, probably being destroyed by soft rot bacteria.

The outstanding features of the late blight situation in 1947 were three in number:

1. Infected tubers left in the ground apparently rot during the winter.
2. The extensive control program followed by the growers.
3. The fact that the first general wave of infection in Delaware seems to be correlated with epiphytotics on the Eastern Shore of Virginia.

AGRICULTURAL EXTENSION SERVICE, UNIVERSITY OF DELAWARE, NEWARK

1947 PENNSYLVANIA TOMATO LATE BLIGHT SUMMARY

R. S. Kirby

Tomato late blight in 1947 was about three-fourths as severe as it was in 1946. If no sprays or dusts had been applied the loss in Pennsylvania in 1947 would have been about 40 percent. However, spraying and dusting reduced the average loss to about 20 percent.

Factors that reduced the amount of late blight loss in 1947 were the late appearance of the late blight organism and the period of hot weather which started in August. In 1946, late blight was first found on tomatoes on May 28 and on potatoes on June 8. In 1947, late blight was first found on tomatoes on July 9 and on potatoes on June 27. Surveys of several hundred tomato fields indicated that no late blight came into the State on plants. It appeared that the tomato form of late blight wintered over on potatoes in Pennsylvania and spread from potatoes to tomatoes.

The loss to tomatoes was most severe in the central and northern parts of the State where 50 to 90 percent of undusted and unsprayed tomatoes had blighted. In the area around Philadelphia, the loss in 1947 was from a trace to 10 percent, while in 1946, it ranged from 33 to 70 percent. In the western part of the State, late blight was nearly as heavy as in 1946. Near Lake Erie late blight did not appear until in October and then caused only a moderate loss.

The period of 1947 hot weather which started early in August checked most of the late blight in southeastern Pennsylvania, but further to the north and west where it was slightly cooler, late blight continued to spread.

A spray information service on tomato blight was conducted. Spraying or dusting with copper was recommended. At least twenty-five tomato spray rings were in operation. Spraying, where timely and properly applied, prevented and stopped late blight. Dusting was observed to be less effective than spraying.

PENNSYLVANIS STATE COLLEGE, STATE COLLEGE

LATE BLIGHT OF TOMATOES IN NEW JERSEY IN 1947

C. M. Haenseler

Late blight on tomatoes in 1947 was far less important economically than in 1946. The disease was present in the State as early as April 25 on greenhouse-grown plants and remained in an active condition throughout the summer and until after heavy frosts in the fall but at no time during this period was there a very destructive development of the disease on tomato fruits over an appreciable area.

The history of the advance of the blight disease in 1947 was about as follows: On April 25 the disease was observed on young plants in a greenhouse in Burlington County into which a few infected plants had been brought late in the fall of 1946 and kept all winter for production of fruit for table use. A few blight-infected fruits were still on these old diseased plants after the young tomato plants were potted and the old plants were not removed until after there was evidence of infection on some of the 6-inch tall potted seedlings. It was evident therefore that the blight in this case had overwintered on the old plants and had spread from these to the seedlings. All of the obviously diseased potted plants were discarded and the remainder sprayed repeatedly with copper fungicides and no further trouble from blight was reported from this source.

The next case of Phytophthora infection was detected on July 3 on potatoes, also in Burlington County. This was in no way associated with the greenhouse case on tomatoes observed on April 25 but seemed rather to have originated from diseased refuse from a pile of blight-infected potatoes which had been temporarily stored in the field the previous fall.

Tomatoes growing near this infected potato field showed no blight on July 3 but by July 11 the disease had spread to, or developed independently on tomatoes close to the infected potatoes. This was the first field infection (July 11) observed on tomatoes in 1947. By July 15 the blight had been observed in small amounts in three counties; -- Burlington on July 11, Salem on July 14 and Middlesex on July 15. Soon after July 15 the disease was detected in field after field and before August 1 there was evidence that blight had become statewide in distribution. In some cases infection was very conspicuous on the foliage but almost absent on the fruits, and in general, blight was less prevalent on the fruit than on foliage this year.

Phytophthora infection was also widely scattered here and there over the State on potatoes but despite the fact that the disease started on July 3, which is unusually early for potato blight in New Jersey, the disease did not become severe in many fields. In some cases blight could be found in an active state in a particular potato field week after week and still affect only a plant here and there. This continuous presence of the disease but failure to attack a large percentage of the plants also occurred on tomatoes. The infection pattern therefore seemed to be very similar in both potatoes and tomatoes.

The cause for the small amount of tomato blight in 1947 as compared to 1946 in New Jersey may be due to several factors. It was quite obvious that the most important of these factors was weather conditions. Even in fields where blight became established early in the season and where no fungicides were applied it was observed that new infections occurred during every brief damp period but the lesions would dry up and sporulation cease again within a few days when weather conditions became less favorable for the blight. At no time were temperature and humidity conditions highly favorable for sporulation and infection over long periods of time such as occurred in 1946.

There were other factors operative which no doubt helped materially in preventing an epidemic of tomato blight in New Jersey this year. In 1947 we received no blight-infected plants from the South whereas in 1946 infected southern-grown plants were known to have been sent north in large quantities, and while no conspicuously diseased plants were received in New Jersey, there was evidence that incipient infection in certain lots had occurred before they arrived here.

In 1947 New Jersey also used much more copper and other fungicides on tomatoes than in 1946. While this can not account for light infections in unsprayed fields the general use of fungicides no doubt prevented serious outbreaks of blight in many fields where conditions were highly favorable for development of the disease.

In all cases where direct comparisons could be made between plants treated with fungicides and comparable plants that had received no fungicides it was again evident that late blight of tomatoes can be successfully controlled by the use of copper and certain other fungicides.

No observations were made this year on varietal susceptibility.

NEW JERSEY AGRICULTURAL EXPERIMENT STATION, NEW BRUNSWICK

LATE BLIGHT IN NEW YORK STATE 1947

Charles Chupp

On Potatoes. The estimate of the total loss in the State, as presented by the potato inspection service, is 20 percent. Fifteen percent of this loss is due to reduced yield and 5 percent is the result of tuber rotting. This seems rather a large loss during a year when much spraying was done. First, it probably was the worst year for blight ever recorded in the State. The blight came early and was able to spread almost the entire season. Secondly, nearly all the spray rings accepted a maximum number of acres to spray. Then it rained continuously so that the spray operator could not make any applications at critical times, or came so late that infection had taken place. In order to cover the acreage, the operator was tempted to drive the tractor too fast, and to neglect adjusting or cleaning nozzles. There still are many growers of garden plots or small acreages who did not spray at all.

On Tomatoes. Although 1947 was a worse year for blight than was 1946, the total tomato crop loss was much less. Conservative estimate for 1946 was a 50 percent loss; some placed it as high as 70 percent. Nearly every tomato-growing county was visited in 1947, and approximately 200 people were interviewed in regard to the losses for the present season. Some growers reported no blight, while a few said their crop was a total loss. But the average of the combined reports was slightly over 7 percent. It, therefore, would seem justifiable to suggest 7 to 10 percent as the loss in the tomato crop.

The great reduction in loss from that of 1946 was due to early and frequent warnings over the radio, in news articles, and to county agricultural agents, that the crop should be sprayed or dusted with copper. There was hardly a gardener who did not attempt making some applications. Canning companies and county agricultural agents organized spray rings and in a few instances airplanes were used. Even one application of copper did some good and where five or six applications were made, the crop was almost free of blight rot.

Late in the season some growers became alarmed because their copper-sprayed plants were dying. They thought blight was the cause, but in all the instances observed by the extension specialist, this late infection was caused by Cladosporium leaf mold.

All indications are that throughout the entire State the greatest virulence obtainable of the fungus on tomatoes was present during the entire season, so that tomatoes became infected as early as the weather permitted development of Phytophthora.

There was a distinct difference of susceptibility of tomatoes the previous year when some of the Phytophthora inoculum could affect only the more susceptible tomato varieties, and do this as readily as it could cause infection in Green Mountain potatoes. Still other varieties of tomatoes were almost immune until late in 1946. But in 1947 all were susceptible.

CORNELL UNIVERSITY, ITHACA

TOMATO LATE BLIGHT NOT IMPORTANT IN CONNECTICUT

James G. Horsfall

We do not feel that late blight blight of tomato amounted to anything of consequence in Connecticut in 1947. We did find some of it occasionally in a garden or two but this is more or less normal in this State.

Late blight of potato appeared to be of as much consequence in 1947 as it was in 1946, but late blight of tomato certainly was not.

CONNECTICUT AGRICULTURAL EXPERIMENT STATION, NEW HAVEN

LATE BLIGHT IN 1947 IN RHODE ISLAND

John B. Rowell

In Rhode Island during the past season, late blight was widespread on potato foliage while only a trace of this disease was found on tomatoes. Late blight was first observed on potatoes on July 21 in the area around Kingston, Washington County. The disease apparently became established during the cool, moist period of July 19 to 20. The source of the primary inoculum was not determined. The weather from July 19 to July 24 was especially favorable for the disease and during this period it spread throughout the potato-growing areas of the State. The disease was very destructive in poorly protected fields; 90 percent defoliation was observed in several such fields on July 28. Additional outbreaks of the disease occurred during the favorable weather of August 16 to 18 and September 14 to 16.

The disease was adequately controlled in those fields sprayed weekly with a 10-5-100 Bordeaux mixture at a rate of 150 gallons per acre. Fields in Newport County that were dusted with neutral copper had a higher percentage of infection early in the season than nearby Bordeaux-sprayed fields.

The importance of late blight on the potato crop for the past season is difficult to evaluate. For poorly protected fields, this was a severe blight year as evidenced by their early defoliation. However, most growers were influenced by losses of last year to follow the Experiment Station recommendations. Late blight was effectively checked in their fields. An overall loss of 10 percent is estimated for this State.

Only traces of late blight on tomatoes were observed in Rhode Island during the past season and losses were negligible. The disease was reported on this crop in Newport County on July 30, and in Washington County on August 8. These fields were carefully observed but little spread of the disease was noted, even during the periods of favorable weather in which this disease was highly active on potatoes.

RHODE ISLAND STATE COLLEGE, KINGSTON

POTATO AND TOMATO LATE BLIGHT SUMMARY FOR MASSACHUSETTS, 1947

O. C. Boyd

This year, the weather for June and July was not far from normal. The mean temperature for July was 2.4° F. above normal and total precipitation 1.36 inches below normal, but the number of rainy days was 3 above normal. The occurrence of late blight on potatoes during those two months was about what we usually find, that is, scattered primary infections on cull piles and in poorly sprayed or unprotected fields, with limited secondary spread during the latter part of July.

This year in only one section of the State did the disease make appreciable headway on potatoes during July even in unsprayed fields, namely in Bristol County where weather conditions are likely to be conducive during July in any year. During the first week of August, a few scattered light infections were observed on potatoes in the Connecticut River Valley. But so far, not a single confirmed case of late blight on tomato had been reported.

The weather for August turned out to be abnormally warm and dry with a mean temperature at Amherst of 73° F. (normal 68.6°) and 1.67 inches of rainfall (normal 4.08). In fact, the warm weather continued until September 15. The mean temperature for September 1 to 15 was 72.9° F. With light rains on August 16 and 20, and heavy rainfall August 26 and September 2 (0.95 and 1.21 inches respectively), late blight made only slight headway anywhere in the State during that comparatively warm, dry period from August 1 to mid-September. Nevertheless, the fungus did remain active in some sprayed and unsprayed potato fields and it even spread considerably in certain fields with abnormally heavy vine growth. Still, the disease had not appeared on tomatoes even on thickly matted (tomato plants) vegetable cull piles located in sections where late blight was present on potatoes during the latter half of July.

Following the rainy period of September 13 to 16 (0.79 inches), the weather suddenly turned and remained cooler, and late blight really "came into its own" until plants were killed by freezing temperatures on September 27 and 28. The mean temperature for the period September 16 to 26 was 55.4° F. Late blight increased rapidly in potato fields where protection had not been maintained and it showed up generally around September 22 to 26 on unprotected field and garden tomatoes that had not been staked or trellised.

In general late blight behaved on potatoes as one might expect it to during the kind of season that prevailed. The situation on tomatoes suggests that either the tomato strain simply was not present until late in the season (which situation is the normal one here), or that the weather was not sufficiently cool and moist from mid-July to mid-September for it to develop even on unstaked and untrellised tomato plants.

Losses from late blight in Massachusetts this year might be rated as a trace on tomatoes and about 0.5 percent on potatoes.

With the kind of weather conditions that prevailed generally, late blight on potatoes was readily controlled even by dusting programs.

MASSACHUSETTS STATE COLLEGE, AMHERST

LATE BLIGHT IN VERMONT, 1947

Thomas Sproston

The first appearance of late blight of potato in the State was on July 7 in the north-central potato-growing section. This was the earliest date on record for the appearance of late blight, according to several who have worked in the State for many years. By August 1 to 10 late blight was general throughout the northern part. Unsprayed fields showed complete death of vines by August 15. The disease was more severe this year than last on vines, but because of dry weather in September very little tuber rot was reported or observed.

Late blight on unsprayed tomatoes was observed in the Lake Champlain Valley at Shelburne on July 23. As in other unsprayed garden plots the crop was a total loss in ten days time. The disease was easily controlled this year in fields that were sprayed or dusted before the above date. Late blight appeared east of the Green Mountains in the potato-growing section at the same time that it appeared west of the Green Mountains in the Champlain Valley. This is of interest because late blight was severe on potatoes east of the Green Mountains long before its appearance on tomatoes. Also, there are no potatoes grown, except in home gardens, in the Champlain Valley. Although there was severe blight on potatoes east of the Green Mountains, the disease was easily controlled on tomatoes this year by spraying.

Tomatoes were planted late this year. Total rainfall for June was 4.84 inches and for July 4.9 inches. Frequency of rains and temperatures were favorable for blight development on tomatoes during July but infection was not so heavy nor so general as it was last year.

UNIVERSITY OF VERMONT, BURLINGTON

LATE BLIGHT ON POTATOES AND TOMATOES IN NEW HAMPSHIRE FOR 1947

M. C. Richards

The incidence of late blight in New Hampshire for 1947 was spotted. In the northern part of the State a few moderate outbreaks occurred. No tomatoes are grown commercially in this area and as most commercial potato growers follow adequate spray or dust programs, tuber rot was held to a minimum. In the southern part of the State the weather was favorable for blight development during July. A few farms reported moderate leaf infection, but here again the spray and dust programs plus unfavorable weather for blight development in August and September resulted in excellent blight control. The weather was so unfavorable for blight development in the Durham area that untreated plants in the fungicide test plots were free from disease. During August only 0.62 inches of rain fell as compared to over 8 inches for 1946, and during September and up to the present time, October 17, during the harvest season, one of the longest dry spells in the history of the State has occurred.

Losses from late blight on tomatoes and potatoes will be lower in New Hampshire this year than in many years.

NEW HAMPSHIRE AGRICULTURAL EXPERIMENT STATION, DURHAM

LATE BLIGHT UNIMPORTANT IN MAINE

M. T. Hilborn

Late blight was relatively unimportant in Maine in 1947. The weather during the latter part of the growing season was not favorable for its development. Only a few scattered instances were found on tomatoes, and no commercial loss occurred.

On potatoes the disease was not causing much loss at digging time. In the central part of the State (Piscataquis County) late blight was fairly common and in some fields losses up to 10 percent were estimated. In Aroostook County the area around Fort Fairfield, Caribou, Presque Isle, and Mars Hill (central Aroostook) had very little late blight. South of Mars Hill the disease was quite general, but losses at digging time were light. However, many growers were digging while the vines were green and some storage losses can be expected.

MAINE AGRICULTURAL EXPERIMENT STATION, ORONO

SUMMARY OF LATE BLIGHT IN OHIO, 1947

T. H. King

Late blight was reported as present in commercial tomato plantings in 17 counties in Ohio, first making its appearance on tomatoes July 17 in Meigs and Washington Counties. However, it was also reported on potatoes on July 11 in Miami County.

The disease has been universally reported on both potatoes and tomatoes in small garden plots throughout the State. Although the disease was first reported on tomatoes in the southeastern corner in the staked tomato area, it did not spread from the original fields and caused no appreciable loss in the rest of the staked tomato area. In the commercial canning area in the northwestern part of the State it has been impossible to make an estimate of the amount of loss caused by late blight this year, since the crop was very late in its development and was largely destroyed as a result of the early frosts. However, the disease was reported as universally present in the canning areas just prior to the killing of the tomatoes by the frosts.

In contrast to last year there was no infection of young plants at setting time by the late blight disease, and in no case were southern transplants found to be infected with the disease.

Spraying, ground dusting, and airplane dusting were all practiced in Ohio this year for the control of late blight. One airplane company reported dusting 3000 acres of tomatoes. The results of our experimental plots indicated that the recommended spray schedules gave excellent control, whereas in the non-treated checks 75 percent of the plants were destroyed by the late blight disease. Approximately 10 percent of our commercial growers attempted control measures this year. Many others were prepared to spray or to dust if conditions became favorable for the development of late blight in fields where the tomatoes had progressed sufficiently to warrant the expenditure. It must be understood that the commercial tomato crop was a month late in development this year and in many cases fields were not sufficiently developed to warrant expenditure for fungicidal applications for disease control.

Generally speaking, after the plants were set in the field weather conditions were unfavorable for the development of the disease this year during most of the growing season. Favorable weather conditions for late blight development did not occur until September at which time wet, cool weather prevailed. There was an immediate increase in prevalence and distribution of late blight, but the crop was destroyed by frosts before the disease could take its toll.

OHIO STATE UNIVERSITY, COLUMBUS

LATE BLIGHT ON POTATOES AND TOMATOES IN INDIANA IN 1947

R. W. Samson

Late blight developed to a limited extent on Indiana tomatoes in 1947 wherever rains during July kept vegetation luxuriant. Locally severe damage occurred in a few fields in southwestern, central, and, in a restricted area, in northeast-central Indiana. Elsewhere, the disease could mostly be considered as a trace.

Blight-infected very early potatoes seem the most likely source of inoculum for the southern and central occurrences of the disease. Blight-infected tomato transplants from the Lower Mississippi Valley area are suspected as the most likely source of the disease in northeast-central Indiana, and probably elsewhere.

Except for a period of relatively limited rainfall from about June 10 to July 12, the season from early May to August 3 was favorable for tomato late blight. Delayed setting and limited plant growth during this period were considered a deterring factor.

Initial sources of the disease and opportunities for build-up were obviously much less for this period in 1947 in Indiana than for the same periods in 1945 and 1946. Above-normal August temperatures generally checked the disease, except apparently in the limited northeast-central area.

Limited development of blight on very early potatoes occurred during late May and early June in southern Indiana, with a few locally quite severe cases. Very limited rainfall occurred throughout the commercial, muck soil potato area of northern Indiana during July, August, and much of September. Only two reports of late blight on potatoes have been recorded from that area.

In chronological order, the Indiana late blight situation this past season was about as follows:

May 23: Late blight was reported on very early potatoes in Warrick County in southwestern Indiana. Temperatures and rainfall during May in this area were favorable for the disease, particularly where early and heavy foliage growth augmented the general humidity level.

May 23-June 12: Rains seriously delayed setting of the canning tomato acreage.

June 12-June 21: Late blight was anticipated in late July and early August if weather then should duplicate that of the same period in 1945.

Contributing factors: (1) Above-normal rainfall and below-normal temperatures during May and to about June 12. (2) Possibility of limited but rather widespread introduction of the disease on tomato transplants shipped to many sections of the State from western Tennessee and Kentucky during early June. However, there is no record of late blight intercepted in Indiana on plants from those areas. (3) Anticipated heavy vegetative growth of many late-set and direct-seeded tomato fields.

July 14-July 22: Tomato late blight was noted in Vanderberg (southwestern) and Hendricks (central Indiana) Counties. Limited plant growth and restricted rainfall were considered unfavorable for the disease in much of the State.

July 22-July 30: Specimens and confirmed reports of tomato late blight were received from Dubois, Jefferson, Putnam, Montgomery, and Huntington Counties, apparently associated with a period of showery weather subsequent to July 12. Blight development was suspected wherever rains during July kept general vegetation luxuriant over sizeable areas.

July 30-August 15: Additional reports of late blight came from Warrick County, and first reports from Howard, Jackson, Washington, Orange and Pike Counties.

Temperatures subsequent to August 2 were above-normal and checked any additional blight throughout the State, except possibly in Howard and Grant Counties.

August 15-September 2: Several severely blighted tomato fields were observed on August 30 in southern Grant County. The disease here was associated with (1) woods breaking prevailing winds from the southwest; (2) heavy fertilization and consequent rank vine growth; (3) tall corn fields almost entirely surrounding the tomato fields.

September 2-September 24: Reports were received of destructive late blight in a limited area in Howard and Grant Counties. Local rains kept pastures and general vegetation luxuriant in this area during August.

September 24: Late blight was found in abundance in one potato field in Kosciusko County, adjacent to a large lake. No damage resulted, as frost and herbicides were killing the vines. No tuber infection was found, but the field was in danger if heavy rains should occur before complete death and dessication of the vines.

October 20: Two blight-infected potato tubers were received from LaGrange County, a dry area during August and September.

October 20-October 31: Late blight damage was suspected on July-planted potatoes in the Ohio River counties, but no reports were received.

PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION, LAFAYETTE

PRACTICALLY NO LATE BLIGHT IN ILLINOIS

M. B. Linn

Following his discovery of late blight on tomatoes in Union County, Illinois, on July 30, Mr. G. H. Boewe of the State Natural History Survey revisited this area later without finding any evidence of spread to other plantings. By August 19, the fungus could not be seen even in its original location.

Between July 1 and October 1, both Boewe and I visited at one time or another practically every tomato canning area in the State. At no time did we find any trace of late blight. Inspection of potato fields in the northern part of the State during August and September did not reveal any late blight infections. In most years we have been able to find at least traces of late blight on potatoes in the northern tier of counties. We were told that late blight was present in a potato field in Whiteside County but we were unable to find any.

There is little doublt but that weather conditions were more favorable throughout most of the State for late blight development in the spring and early summer of 1947 than they were in 1946. On the other hand, the weather was less favorable during July and August of 1947 than during the same period of 1946. Late blight on potatoes was widespread in Adams and Madison Counties in 1946 but was not present in these areas in 1947 despite more favorable weather for blight. Perhaps lack of infected planting stock is the sole explanation. Weather was more favorable for blight on tomatoes in the Vermilion County area in May and June of 1947 but the disease did not appear. Again, perhaps this is due to blight-free potatoes in the vicinity plus the absence of Phytophthora on southern-grown tomato plants.

Early in the season, arrangements for late blight reports were made with 12 canners' field men or responsible growers in strategic locations throughout the State. None of these reported the presence of the disease. Therefore, we are reasonably sure that late blight was not serious enough in 1947 -- with the one exception cited above -- to be noted in Illinois. We did not see the disease at any time on southern-grown transplants.

UNIVERSITY OF ILLINOIS, URBANA

POTATO LATE BLIGHT IN MICHIGAN DURING 1947

L. Carl Knorr

This report of potato late blight in Michigan during 1947 is based upon the observations of various potato specialists, all of them qualified in the recognition of late blight. To these, appreciation is herewith expressed for assistance during the 1947 Michigan survey; they include: Professor D. L. Clanahan, Professor Henry Moore, Dr J. H. Muncie, Dr. Ray Nelson, Mr. H. A. Riley, Dr. J. R. Vaughn, and Professor Ernest Wheeler.

Potato late blight was first observed in Michigan this year the 23rd of July. Isolated plants in numerous fields of the Upper Peninsula's Luce, Schoolcraft, Delta, and Marquette Counties showed leaf infections on examination by Professor Moore. In a few low spots, infection was heavy, but in general it was of little significance. Later, dry weather inhibited the spread of late blight, and frost killed the tops before subsequent infections could make much headway.

Some 40 Upper Peninsula fields, most of them growing seed, were visited by Mr. Riley at digging time; in only two was any tuber blight observed. Losses were negligible. Previous to digging, Mr. Riley's survey of Upper Peninsula fields revealed leaf infections in the counties of Iron, Menominee and Delta, but these were slight and scattered except for several fields in Delta County which were completely down from leaf blight. No report of tuber loss has yet come to this office on these fields. No infections, leaf or tuber, were observed from the Cooks area east to Newberry.

Professor Clanahan, also reporting for the Upper Peninsula, declares that while late blight got an early start in the fields of Delta, Marquette, and Dickinson Counties, the effect on vines was so slight that it is doubtful whether yields were affected. A few fields in this area showed tuber blight, but in no affected field did losses from tuber rot exceed 1 percent.

Potato late blight in the Lower Peninsula was first reported on July 28, when it was observed in Professor Wheeler's irrigated experimental plot at Pinckney (Southeastern Michigan). Its development in this area was halted by a late summer drought and heat wave and not until digging time did late blight weather set in again. Losses from tuber rot, if present, have probably been low, judging from the lack of questions coming to this office. However, one field has been reported as being affected with 25 percent tuber rot. While the affected field was sprayed regularly, the growth of vines on this muck farm was so rank that difficulty was encountered getting in with machinery for the later applications. Late blight was also present in East Lansing where Dr. Muncie noticed it on his dusted experimental plots. Ten percent of the tubers were late blight-affected.

Late blight was also reported on potatoes in the Grand Rapids area (northern part of Southwestern Michigan). Several fields with leaf blight came to the attention of the writer, and Dr. Nelson reports a small degree of tuber blight in his unsprayed rotation plots on muck.

Mr. Riley surveyed the Rogers City area (Northeastern Michigan) late in July and saw some leaf blight, but a survey of the same fields at digging time revealed no tuber rot whatever. In fact, none of the Lower Peninsula fields he visited at digging time -- and those totaled about 100 -- showed any sign of tuber late blight.

It is the consensus of potato specialists in this State that in 1947 potato late blight affected vines to a moderate extent in scattered fields throughout the State. This infection was slowed down or came to a halt because of dry hot weather the latter part of July, and loss in yield due to leaf blight was generally negligible. Favorable late blight weather again set in during the digging season, but with a few exceptions, tuber late blight was inconsequential.

MICHIGAN STATE COLLEGE, EAST LANSING

TOMATO LATE BLIGHT IN MICHIGAN, 1947

M. C. Strong

August, 1947, was one of the hottest dry periods ever recorded at our local weather station, as well as in the entire southern portion of the State. No late blight appeared until mid-September, when it was reported from two fields in Oakland County and several points in Lenawee and Monroe Counties. The loss due to this disease is estimated at less than 1 percent of the crop. Killing frosts occurred within one week of the first appearance of the disease.

About 700 acres of tomatoes in Lenawee and Monroe Counties were dusted twice with Dithane by airplane. No late blight was reported from these fields.

One tomato field that showed considerable infection had been planted last season with potatoes, which had been blighted.

MICHIGAN STATE COLLEGE, EAST LANSING

POTATO LATE BLIGHT IN WISCONSIN

R. E. Vaughan

Owing to seasonal conditions of drought and high temperature in July and August, the late blight disease did no damage to the Wisconsin potato crop. Traces of blight lesions were found September 19 in Walworth County on a muck farm, on late Katahdin and Russet Burbank varieties only. Reports of traces in Marathon County have been received but have not been substantiated by specimens. I have been watching potato disease development in Wisconsin for the past 36 years, and have seen less blight this year than in any other in my memory.

Spray and dust applications were carried out by our Economic Entomology Department. Because of lack of blight infection in the plots no disease data are available. Applications of bordeaux mixture, tribasic copper sulfate, Dithane, and Parzate were made in combination with DDT as the insecticide. Yield data are not available at this time.

No late blight was seen or reported on tomato plants.

UNIVERSITY OF WISCONSIN, MADISON

LATE BLIGHT IN MINNESOTA -- 1947

C. J. Eide

Tomato

None was seen and none reported, as compared with an estimated loss of 10 to 20 percent in 1946.

Potato

Blight was a little more prevalent on potatoes than in 1946, when it was seen on only two peat fields. The 1947 situation may be summarized as follows:

1. First reports. Hollandale, July 9; Red River Valley, August 19; Two Harbors, about August 20; Duluth area, September 6; none was observed in North-central Minnesota except a trace at Grand Rapids, in September.

2. Severity. Hollandale: Infection was heavy in spots of poorly sprayed fields in July, but in general the disease was kept under control during the season.

Red River Valley: Blight was general, though light in most fields as far south as Nielsville, which is about 30 miles south of East Grand Forks. South of Nielsville there was less rain during the summer than there was further north. One field near Donaldson in Kittson County was 100 percent infected, and about 75 percent defoliated. This was the worst outbreak observed.

Duluth and Two Harbors: Blight was general, but severe only in a few spots. One field of Green Mountain was reported 50 percent defoliated.

Although blight caused appreciable foliage loss in very few places in Minnesota, it is too early to know how much tuber rot will result, and this is the most destructive phase of the disease. One carload of potatoes from Warren in the Red River Valley has been reported with 12 percent infected tubers. There will probably be more in fields harvested before the severe frost of September 21. A few blighted tubers were observed at harvest near Hollandale.

3. Source of infection. Blight was observed on volunteer plants from pitted potatoes near Hollandale. No infection was found on potato dumps in the Red River Valley, in spite of a careful search. Infection there probably started from seed. No observations were made of dumps in the Duluth area, so the source of infection is unknown.

4. Use of fungicides. Growers in the Hollandale area use Bordeaux or Dithane, and spray as often as seven times during the season. Control seems to be very effective. Most of the growers in the Red River Valley dust with slow soluble coppers, but apply those only about three times, usually too early to protect against blight. Some airplane dusting is done later in the season, but blight was not severe enough to prompt more than a few growers to do this in 1947.

UNIVERSITY OF MINNESOTA, UNIVERSITY FARM, St. PAUL

LATE BLIGHT IN IOWA IN 1947

W. F. Buchholtz

Late blight was found on potatoes in north-central Iowa, near Clear Lake and Fertile, for the first time on July 24. This occurrence probably was coincident with that in the Hollandale, Minnesota, area, which has been reported as first observed on July 9.

As a result of a regular spray program with Bordeaux mixture and continuous dry warm weather, there was very little further late blight development, although as late as September 11 there were some active, sporulating lesions on potato foliage near Fertile.

All spring and early summer, there was cool, wet weather in Iowa, very favorable for late blight development. A heavy rain on the evening of July 4 abruptly terminated this condition and just as abruptly ushered in an extremely dry, warm period which extended at least to October 20, the date of this writing.

With the early occurrence of Phytophthora infestans on potato foliage in northern Iowa, the stage was set for an epiphytotic. Instead, because of the unfavorable weather of late summer and early fall, there was very little development and spread, and the potato crop loss for the season was estimated at a trace.

No tomato late blight was found in Iowa in 1947. Evidently southern-grown plants were not infected, and there was no observed development of late blight on potatoes in commercial tomato-producing areas.

Dr. W. J. Hooker concurs in these observations and in the presentation of this summary.

IOWA STATE COLLEGE, AMES

LATE BLIGHT IN CANADA

I. L. Conners

Late blight (Phytophthora infestans) was first observed on potatoes in Eastern Canada in 1947 at two widely separated points in Nova Scotia on July 17. During the next three weeks it was reported in Prince Edward Island (July 22), New Brunswick (August 8), Quebec (July 30 - August 2), and Ontario (July 28). At the north-western limit of the Warning Service area, late blight was not recorded until August 22, when it was found at Winnipeg, Manitoba.

A full account of the epidemiology of late blight for each of the provinces of Eastern Canada is not available. In Prince Edward Island, where rather complete observations were recorded, the disease was first reported in Queens County, near Charlottetown on July 22 following a week of humid weather. Later observations disclosed that the infection in one field was from a nearby cull pile and that eventually it spread over 14 other fields from this single source. Late blight was found in Kings County on July 30 and in Prince County on August 19.

Growers were advised to begin spraying for the control of blight on July 17 and, in the next two weekly bulletins, to continue their programme. The weather became dry early in August and continued quite dry during August and the first half of September. There was at times some spread of late blight in fields where the disease had become established earlier in the season, but blight was virtually absent in well sprayed fields. In the experimental plots at Charlottetown a late blight epidemic was only established after repeated inoculations. Most fields of the late varieties were atill so green at the end of the growing season that growers were advised to begin spraying with vine-killing sprays on October 1.

Late blight appears to have continued to spread in Nova Scotia, New Brunswick, and Quebec until about the middle of August. The disease had extended along the Saint John River Valley, New Brunswick, from Fredericton to St. Leonards by August 16, infection varying from slight to severe, and extensive blight development was predicted. By the same date late blight had been found in most potato-growing districts of Quebec and further blight development was expected. In Ontario, late blight had been reported from several widely scattered points as early as August 9.

After the above-mentioned dates the weather was generally dry, particularly in the coastal regions of Eastern Canada. Here and there, especially in Ontario and about Montreal in Quebec, late blight was occasionally active and continued to spread slowly. For instance, about Ottawa, in Carleton County, Ontario, late blight was absent from well-sprayed fields, but many commercial fields, which at present are not usually sprayed for the disease, became heavily infected about mid-September. Killing frosts near the end of the month prevented further spread. During a bacterial ring-rot survey some late blight rot was noted in the bin.

Losses from potato late blight must have approached the minimum throughout Eastern Canada in 1947. In 1946, a more normal season, the disease caused little damage in Ontario and Quebec, but it was prevalent on the late crop in New Brunswick and Prince Edward Island and caused losses of 30 percent of the crop in some fields.

Late blight was first reported on tomatoes in Durham and Prince Edward Counties, Ontario, on August 7 and in Northumberland County on August 11, two weeks after its appearance on potatoes in a neighboring county. These reports of late blight may represent the northern limit of the late blight epidemic on tomato and potato, which began in Pennsylvania and then spread northwards over New York. Latterly late blight was reported in Norfolk and Brant Counties (August 26), at Peterborough (September 2), at Guelph (September 5), in Lambton County (September 11), the Niagara Peninsula (September 12), Essex and Carleton Counties (September 16) and in Laval County, Quebec (September 10). Most of the above reports recorded only the occurrence of the diseases. In two instances damage was severe. At the close of the season late blight lightly infected a few gardens about Ottawa, and some late blight developed on fruits picked before the killing frosts in September and placed in storage to ripen. In the Niagara Peninsula the disease was fairly general on field tomatoes and was present on one greenhouse crop. The negligible losses this year are in striking contrast to those of 1946, when late blight was very prevalent throughout the tomato-growing sections of Ontario, completely destroying fields in Essex, Kent, Elgin, Norfolk and Lincoln Counties.

DIVISION OF BOTANY AND PLANT PATHOLOGY, CENTRAL EXPERIMENTAL FARM, OTTAWA, ONTARIO, CANADA

SOME NEGATIVE REPORTS

NO LATE BLIGHT IN TEXAS:

G. H. Godfrey

There was no late blight in either potatoes or tomatoes in Lower Rio Grande Valley fields this year; and in so far as I have been informed in any of the other tomato or potato areas, in Texas.

TEXAS AGRICULTURAL EXPERIMENT STATION, SUBSTATION NO. 15, WESLACO

NO LATE BLIGHT IN ARKANSAS

V. H. Young

Although we were on the watch throughout the season and corresponded with men in the plant-raising areas of the State and in the green wrap area, we had no evidence whatsoever of late blight on either tomato or potato.

UNIVERSITY OF ARKANSAS, FAYETTEVILLE

NO LATE BLIGHT IN MISSOURI

C. M. Tucker

We have no records of the appearance of late blight on either potatoes or tomatoes in Missouri during the past season. Although the early part of the season had conditions favorable for the development of the disease, the latter part, beginning July 1, was exceedingly dry and warm.

UNIVERSITY OF MISSOURI, COLUMBIA

THE PLANT DISEASE REPORTER

Issued By

THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey
BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING
AGRICULTURAL RESEARCH ADMINISTRATION
UNITED STATES DEPARTMENT OF AGRICULTURE

SUPPLEMENT 172

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Supplement 172 Issued April 15, 1948

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

PLANT DISEASE REPORTER SUPPLEMENT

Issued by

THE PLANT DISEASE SURVEY
DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station Beltsville, Maryland

INDEX TO PLANT DISEASE REPORTER SUPPLEMENTS 167-171, 1947

Compiled by Nellie Ward Nance

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Supplement 168. Disease survey of soybean nurseries in the South. pp. 27-53. June 1, 1947. By J. L. Weimer.

Supplement 169. A host index of Mississippi plant diseases. pp. 55-168. June 15, 1947. By J. T. Presley. Contains its own host index, page 56, index to pathogens, page 131, and index to common name of host, page 161. Viruses and genera of pathogens are listed below.

Supplement 170. Soil fumigation for control of nematodes and other soil-inhabiting organisms. pp. 169-189. July 15, 1947. By Jesse R. Christie.

Supplement 171. Tomato late blight in the warning service area in 1947. Foreword by Paul R. Miller and Jessie I. Wood. State reports by various authors; see its table of contents and the author index below. pp. 191-236. December 15, 1947.

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ERRATA

Page 7: Soybean, target spot. The location was omitted; Florida should be inserted in the second column.

11: Corn, zonate spot. The name of the organism should be *Gloeocercospora sorghi*.

36, under *Ipomoea batatas*, read *Physarella oblonga* instead of *Physorella*; also on p. 149.